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VETERINARY MEDICINE

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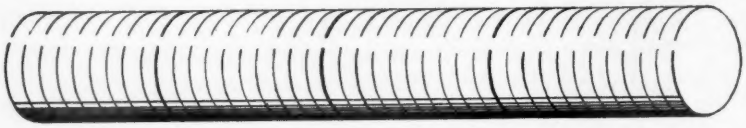

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If ewes suffering from pregnancy disease are treated immediately upon the appearance of symptoms (as soon as they are noted hanging back from the herd) a surprising number recover—upward of 50%. The treatment is dextrose intravenously and some form of sugar as a drench.

* * * *

Recent nutritional research indicates the usual ration for young pigs is not sufficiently high in protein and that the rations fed later, to shotes weighing around 75 pounds and more, is unnecessarily high. There is evidence that the swine raiser can, with profit, take a leaf from the poultry raiser's book of experience and provide a "starter" for his pigs when they are weaned.

* * * *

Sulfapyridine is being credited with remarkable results in the hands of some veterinarians in the treatment of calf pneumonia. The dose recommended is 2½gm morning and night for three days and, in case longer treatment is required, 1gm three times daily thereafter. Temperatures are reduced to 103°F. or less within 18 hours after the administration of sulfapyridine is commenced. Watch calves that are coughing. If the temperature goes above 103°F. it indicates the onset of pneumonia and sulfapyridine should be given immediately. Oral administration is the route of choice.

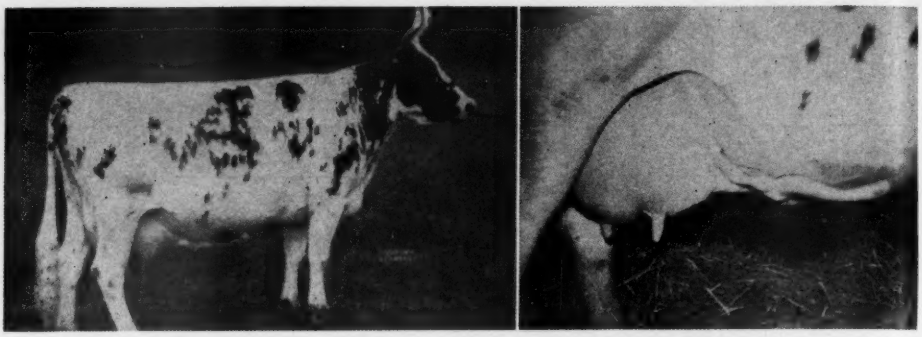
Fifteen shorthorn bulls were imported from Scotland recently at a cost of $18,400 or an average of $1,226 a head. These "war refugees" it is thought will be the last of their kind for a considerable period.

* * * *

The concept that antisera cannot reach viruses once they have reached the cell and established themselves within, does not imply that antisera must be valueless in the treatment of virus diseases. Viruses attack the cells of the body as an epizootic attacks the animals of a community—a few at first and from these spreading to others. Antisera circulating in the blood and lymph have the opportunity to neutralize viruses as they migrate from cell to cell, just as they may act upon bacteria which are attacking the cells from without.

* * * *

The importance of vitamin E in the human diet is being stressed to the public. The vitamin E content of various foods is played up as a reason for their selection. Bread, the most widely used food, is advertised to contain wheat germ and hence to be rich in vitamin E. All of this means less of this vitamin in the feed for animals. By-products of the milling industry heretofore contained the germ of milled grain; now it is being included in the part used for human food, and the by-products that go into animal feed are being deprived of vitamin E.



STRATHGLASS MISS VIOLET—"A QUEEN OF THE DAIRY WORLD"

This Ayrshire, now 15 years old, has produced 131,179 pounds of 4% milk, over 65 tons, 5,202 pounds of butter fat, and 10 calves. She is still hale and hearty. Strathglass Miss Violet was exhibited at the 1939 New York World's Fair and proved a feature attraction. She was then taken on a tour of the country as a demonstration of why the Ayrshire is the breed for progressive farmers. She was exhibited at the 1940 World's Dairy Congress at Waterloo, Ia., where this photograph was taken by Dr. Lawrence Scott. As will be seen in the illustration on the right, she supports the contention that the size and tortuousness of the "milk" vein is an indication of the milk-producing capacity of the cow

The identification of "carrier" cattle by the application of the agglutination test and the adoption of isolation methods are, in selected cases, controlling Bang's disease. The success attending this method depends largely on the conditions available for isolation and prevention of the reintroduction of infection.—*T. Dalling,* in *The Vet. Record.*

* * * *

Hepatic disorders of cattle are responsible for a large economic loss and are attracting much attention and considerable study at the present time. Fifty-five million pounds of beef livers were condemned in federally inspected abattoirs from 1935 to 1940. About two-thirds of the condemnations are due to abscesses; the remainder chiefly to telangiectasia, distomiasis and miscellaneous causes. The etiology of liver abscess is unknown. Navel infection in early life is suspected of being a factor. Some of them and perhaps many are thought to result from foreign bodies that have penetrated the reticulum or perhaps the omasum walls, and entered the liver. Others regard them as likely of nutritional origin, the great majority being found in fat animals. Necrophorus organisms are commonly found in the abscesses, but since they are ordinarily secondary invaders in other locations, they are not regarded as the primary factor here.

Fifteen horses, perfectly preserved, have been found 25 yards underground in the Siberian ice. They wore harness of the Bronze Age (about 4,000 years ago).

* * * *

It May Happen

Medical authorities agree that the stage is set for a devastating pandemic of influenza in the coming months. In the 22 years that have elapsed since the last worldwide pandemic of this disease a vast number of susceptible persons have come into the population. Now as then, war has brought about a vast dislocation of populations and agglomerations of individuals of diverse origin; now as then, normal sanitary codes have been abolished in populous communities by the holocaust of war; now as then, millions underfed, malnourished and poorly housed furnish a hotbed for stepping up the virulence of the never-absent virus.

Into this gloomy picture there is but a single ray of hope. All the vast study and research that the problem of influenza has received in the last 20 years has failed to develop a preventive or anything approaching a specific treatment—unless recent experiments at the Rockefeller Foundation with a vaccine composed of equal parts of swine influenza virus and a modified canine distemper virus should justify the early promise of effective immunization against this worst of modern epidemics—truly "Captain of the Men of Death."

Exit Bovine Tuberculosis

The federal-state tuberculosis eradication project happily became history November 8th with the certifying the last remaining counties, Kings and Merced, California, as modified accredited tuberculosis-free territory.

This bovine tuberculosis eradication project initiated 23 years ago, constituted the most gigantic animal disease control project ever undertaken in any country. More than 232 million tuberculin tests were made in its prosecution—an average of more than 10 million tests a year. Altogether more than 4,000,000 reactors were taken out of the herds to which they belonged and were slaughtered.

It should not be lost sight of that bovine tuberculosis was eradicated by veterinarians. Every step of the way the job was supervised and handled by men trained scientifically in the methods of handling animal disease. Despite much pressure, political and otherwise, professional work was kept in professional hands, with a result that the plan suffered no setbacks. Contrasted with the bungling that has characterized hog cholera control from its inception, tuberculosis control becomes a shining example of the competency of experts and the futility of the uninformed in attempting to solve a problem as complex as disease control.

Now a new project, that of avoiding a recidivation of the disease among our herds, automatically comes into operation. The new project must not be allowed to languish. The tubercle bacillus is a formidable foe. Because it has been vanquished once it must not be taken lightly.

* * * *

The protection of horses against tetanus has been simplified so that the conferring of an active immunity can replace the use of antitoxin. The use of tetanus toxoid in creating such an immunity can be appreciated in war-time. It may be that the veterinary officer of the future will see little or no tetanus, if the authorities adopt this simple and inexpensive method of protection.—*T. Dalling*, in *The Veterinary Record*.

Hilton Oil Administrator

Dr. George Hilton, former Veterinary Director General of the Health of Animals Branch of the Canadian Department of Agriculture, has been named Oils Administrator for the Dominion. Canada formerly depended almost exclusively upon England and Norway for its supply of cod-liver oil and other fish oils. Both sources have been cut off by the war. It will be the duty of the new administrator to see that domestic supplies are developed. Already about 40 fish oil plants have been established on the eastern and western coasts

The Bureau of Agricultural Economics, U. S. Department of Agriculture, estimates the cash income for farmers in 1940 at $8,900,000,000. This is $360,000,000 greater than the income for 1939, and larger than for any other year since 1930 except 1937.

* * * *

"Annabella," a ewe-lamb purchased at the Louisville (Ky.) stock yards for $2.44 about six years ago, has produced 14 lambs with no casualties in five years—two sets of twins, two sets of triplets, and this year quadruplets. This is thought to be a record.

* * * *

By virtue of his scientific education and technical training, the veterinarian is the rightful guardian of the health of all live stock. He alone is qualified to diagnose and prescribe. When laymen encroach upon this field, they endanger the health and well being of the entire live stock industry. To the veterinarian justly belongs the sole right to administer prophylactic and therapeutic treatment. Safeguarding the swine industry is no exception. Anti-hog cholera serum and hog cholera virus should be administered by the veterinarian.—*J. A. Whiting*.

FACULTY OF THE DIVISION OF VETERINARY MEDICINE, KANSAS STATE COLLEGE

Top Row (left to right): G. R. Moore, W. W. Thompson, M. J. Twiehaus, S. J. Roberts, E. E. Leasure, W. M. McLeod, C. H. Kitselman. Second Row (left to right): L. M. Roderick, R. S. Pyles, Alice Kimball (Technician), Margaret Daum (Assistant to the Dean), E. R. Frank, R. P. Wagers. Bottom Row (left to right): Herman Farley, M. S. Cover, E. J. Frick, R. R. Dykstra, J. H. Burt, R. P. Link, J. H. Whitlock. (Extension Veterinarian J W. Lumb was absent when the picture was taken.)

Dairy Council to Assist National Defense Unit

Defense of our nation is uppermost in the minds of all Americans. The long established health education program and the trained personnel of the Dairy Council organization have been placed at the service of the National Defense Advisory Commission. Representatives of the National Dairy Council have been in contact with government officials regarding the contribution of the Dairy Council organization in the present plans for national defense.

Of all the factors in adequate national defense, none is regarded by the National Defense Advisory Commission, as more important than physical health and strength. Physical health and strength depend in a large measure upon sufficient food of the right kind. It is equally important for civilians to be adequately nourished as it is for those who are actively engaged in defense activities. With this as the keynote, a nutrition program on a nationwide scale will be sponsored by government agencies as a defense measure.

The importance of emphasizing dairy products in this expanding nutrition program will not be overlooked. It is the plan of the National Dairy Council, as the educational promotion agency of the dairy industry, to keep in close touch with the national defense program so that dairy products will be given the rightful place they deserve in the national defense nutrition program.—*Dairy Produce.*

Dairy Industries Exhibit Products

At the 1940 Dairy Industries Exposition held in Atlantic City October 21-28, more than 300 companies which provide the milk and dairy manufacturing industry with its myriad requirements in machinery, supplies, materials, services and ideas exhibited hundreds of items, ranging from tiny paper cups to mammoth evaporators and bottle washing machines. Equipment for the milk plant, the creamery, the ice cream factory, the cheese maker, the condensery and the distributor of dairy products—in short, for everyone concerned with providing better milk and milk products to 125,000,000 people—were displayed.

* * * *

Record Milk Production Predicted

The federal bureau of agricultural economics predicts that production of dairy products this winter should establish a new record for the season. An increase of between 1% and 2% in the number of milk cows since last winter and the existence of ample feed supplies, the bureau says, should boost milk production upwards of 2%. Prospects for a higher level of business activity with increased employment should offset the effect of larger supplies on prices.

In July, dairy produce exports were the highest for the month in about two decades and more than five times as great as the 1935-39 July average, but were only about 1% of domestic production.—*Dairy Produce.*

Red Cross Helps Service Men

Some years ago a young seaman in the Navy became totally blind as a result of accident suffered in line of duty. The Red Cross chapter in the town in which the Naval hospital was located had among its volunteer workers an expert braille instructor. As soon as possible this instructor undertook to teach the young man not only the reading of braille, but the performance of simple, necessary services for himself.

When the sailor returned to his home town after discharge, he was met at the station by Red Cross chapter representatives who had been advised of his arrival. Braille instruction was continued by his local chapter, vocational education was arranged for and at last reports, the man had become adjusted to his new mode of life.

This continuation on the part of one Red Cross chapter of the work started by another is a common practice within the organization. And because there are 3,721 chapters, covering virtually every square foot of territory in the United States and its possessions, such cooperation is one of the unique characteristics of the organization.

Aid to the armed forces of the United States is one of the duties imposed upon the Red Cross by its Congressional Charter. This assistance takes many forms. It may be the simple act of writing a letter for one who has been hospitalized and is unable temporarily to do this for himself. It may be the loan of necessary funds to go on leave. Or it may include complete rehabilitation of a man who has suffered permanent disability.

Assistance is not always confined to men on active service. Quite frequently the Red Cross is concerned with their families. On a number of occasions special classes for the wives of men in the service have been organized to give instruction in home hygiene, nutrition or other subjects. At other times assistance in the solution of family problems proves of material help to the individual. This is particularly true in the case of convalescents.

All Red Cross services, whether aid to service men and veterans, disaster relief, instruction in swimming, life saving and first aid, or any of a number of others that are provided on a local and national scale, are supported only from small annual membership dues, voluntary contributions, and gifts. Each year during the annual Roll Call, thousands of service men in the Marine

Corps, Army, Navy and Coast Guard affiliate with the organization, knowing that in doing so they are taking some part in its far-flung activities.

The program of expansion now going on in all branches of the government's armed forces means a great increase in Red Cross work. The annual membership campaign begins November 11 and ends November 30. To continue its work unabated, the Red Cross needs a great number of new members this year. Every American, whether man or woman, should join a local Red Cross chapter during the membership campaign and thus have a part in Red Cross work.

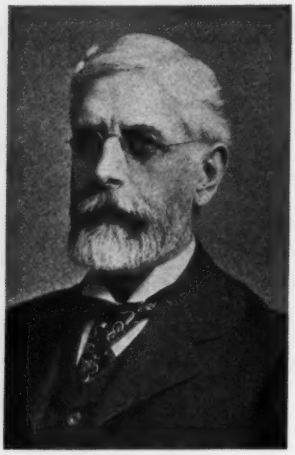
* * * *

Five new 40-dog trucks have been purchased by the Chicago police department for use of its dog catchers. Stray dogs collected on Chicago streets in August totaled 3,339. The city's health department thinks that was not nearly enough; hence the new trucks and increased activity. The interest of the health department is in avoiding another serious outbreak of rabies.

Bureau of Animal Industry

THE Bureau of Animal Industry, U. S. Department of Agriculture, was established by an act of Congress approved May 29, 1884. This act provided for a chief, a clerk, and "a force sufficient for this purpose, not to exceed 20 persons at any one time."

Dr. Daniel Elmer Salmon was the first Chief of the Bureau. He had been employed irregularly by the federal government since 1878. He described conditions at the time he assumed office as follows:



Daniel Elmer Salmon
Chief of the Bureau 1884-1905

Our exported cattle and sheep had recently been refused admission into Great Britain and condemned to slaughter upon the docks where landed because of alleged contagious diseases in this country dangerous to foreign live stock. Our pork had been prohibited entrance into most of the countries of continental Europe because it was alleged to be affected with trichinae, and, therefore, dangerous to the health and lives of the consumers. Twenty-five to thirty million dollars worth of hogs were dying each year from contagious disease. Cattle raisers were in a condition bordering upon panic from fear of Texas fever and contagious pleuropneumonia, and state restrictions intended to guard against these diseases were seriously interfering with interstate traffic in bovine animals. Sheep raising had become precarious in many sections because of scab and other parasitic diseases.

These injurious conditions were so burdensome, and aroused such apprehensions of far greater losses in the future, that there was an agitation and repeated demands for governmental assistance which culminated in 1884 in the enactment of the organic act of this Bureau.

In addition to attacking the foregoing problems, the bureau promptly launched a scientific program and pressed it vigorously during the remainder of the century. It included investigation of hog cholera, swine plague, tick fever, and fowl cholera.

The most pressing duty devolving upon the new Bureau was the control and eradication of the contagious pleuropneumonia of cattle, a disease which had been already the cause of restrictions upon our exported cattle, and which, it appeared, might soon lead to the entire prohibition of this branch of the export trade. Notwithstanding the urgent demand for effective work, the authority given at first was most inadequate. It was not until 1887 that the Bureau was allowed to employ a sufficient force and to use its appropriation properly for stamping out the disease. By this time, the contagion, which had been found prior to 1884 in only a few states on the Atlantic seaboard, had spread to Ohio, Illinois, Kentucky, and Missouri, and threatened to cover such a large area as to be uncontrollable.

By hard and systematic work, however, persisted in for five years, pleuropneumonia was completely eradicated, and since early in 1892 no case of this disease has been discovered in the United States. This first work in which the Bureau was engaged was remarkable in its results, because it succeeded in a very few years in accomplishing what other countries, such as Great Britain, France, Germany, and Belgium, had labored for years to do, without success.

The year 1891 marks the beginning of a second era in the Bureau. It was then that the Congress established federal meat inspection. Of this legislation Salmon later said:

The meat inspection act directs the Secretary of Agriculture to inspect, previous to their slaughter, all cattle, sheep, and swine, the carcasses of which are to be disposed of through the interstate or foreign trade, and authorizes him, in his discretion, to make a

In the Nineteenth Century

postmortem inspection. This enormous undertaking, which was added to the many other duties of the Bureau, was designed to protect our domestic consumers from the meat of diseased animals, and at the same time to enable the Government to certify to the wholesomeness of exported meats. It was specially provided that no beef should be allowed to go abroad unless it had been inspected, and was certified as free from disease.

John Robbins Mohler
Present Chief of the Bureau
as he appeared in 1900

The magnitude of this work was probably not appreciated by the Congress at the time the legislation was enacted, although the desirability of such an inspection is incontestable. Owing to the great extent of our territory and the enormous number of animals slaughtered, it was impossible to at once cover the whole country. It was necessary to instruct inspectors and devise a system of administration with proper safeguards. Beginning at a comparatively few abattoirs, the service has been gradually extended until it is now [Dec. 31, 1900] established in 45 cities and covers the product of 148 abattoirs.

Along with the ante-mortem and post-mortem inspection with which all are familiar, a microscopic inspection of pork for export was also inaugurated. This entailed serious difficulties. There had been no microscopic inspection on a large scale in America. There were no microscopes, appliances, nor trained inspectors. The packers were adverse to the inspection because they feared it would delay their business and damage their meat. However, the swine industry was in dire need of an export outlet and the inspection was inaugurated in 1891 and by 1898 had opened new markets which imported 120 million pounds of American pork. By this time the packers were urgently appealing to the Secretary of Agriculture for its extension. Of conditions at the time and before microscopic inspection was instituted Chief Salmon said:

In 1881 our pork was prohibited entrance into Germany, France, and the principal countries of the continent of Europe on the ground that it was infested by trichinae and was injurious to human health.

Although it could not be shown that our pork had caused disease, and notwithstanding the most vigorous protests by the American Government, the trade was crushed and destroyed. The year before the prohibition went into effect we sold to France 70,000,000 pounds and to Germany 43,000,000 pounds.

For ten years our pork was shut out of nearly every market of continental Europe, when, in 1891, the Bureau began the microscopic inspection and certification of pork destined for the markets of the prohibiting countries. This action led to the removal of the prohibitions, but the restoration of the trade was a slow and difficult process. Our brands of meat were no longer familiar to the people of those countries, commercial connections had been severed, and requirements as to cuts and cures had materially changed. It was like introducing an article into a country for the first time. Moreover, the prohibition had engendered suspicion of our products, while the agitation had established prejudice and antipathy. There were vexatious and burdensome restrictions by both the general and municipal governments, with ill-concealed hostility and every form of annoyance on the part of many officials.

Largely because of lack of refrigeration on boats, food animals were exported to a considerable extent on the hoof; and even before meat inspection at the time of slaughter was undertaken inspection, tagging, and certification of export animals was instituted. By the close of the century more than 400,000 animals were being exported annually. Of this service Chief Salmon in 1900 said:

The fear expressed by foreign governments of the introduction of pleuropneumonia, Texas fever, and other contagious diseases with animals from the United States made it neces-

sary to adopt some method by which the history of the cattle exported could be ascertained, and the animals inspected, numbered, and recorded, so that a certificate could be issued showing freedom from contagion or exposure to contagion. Accordingly, a system of inspection was adopted under the act approved August 30, 1890. A numbered tag was placed in the ear of all cattle, and a certificate of health issued for such animals. Sheep were also inspected, and more recently (1899) horses have been included.

This large export of live animals led to another duty—that of preventing inhumane treatment of the animals—being assigned to the Bureau. These animals were largely carried on "tramp" ships—vessels which were not engaged in a regular trade, but which were sent from port to port after such cargo as could be obtained. As such ships might not carry cattle on more than one or two voyages a year, they had only temporary cattle fittings, and were without conveniences for supplying the proper quantities of food and water. The pens were so insecure and so exposed that frequently both fittings and cattle were washed overboard. The attendants were often inexperienced and worthless. The space was overcrowded. The ventilation was insufficient. The boats were occasionally unseaworthy.

As a result of these conditions, reports frequently reached the public of ships arriving in British ports after an unusually long voyage, with the feed and water exhausted and the animals dying from hunger and thirst. Sometimes during storms it was necessary to fasten down the hatches and it was alleged that then, on account of insufficient ventilation, large numbers of animals would die asphyxiated. Again, it occasionally happened that, in heavy seas, the weight of the cattle would be thrown upon the halters with such force that the fastenings would give way and the animals be mixed and jammed together in the greatest confusion. If the attendants were inexperienced, or, for any cause, unequal to the occasion, some of the animals would be crushed and trampled to death, others would be bruised and maimed, and the general appearance of those landed would make a most unfavorable impression. The result of these conditions was described by Chief Salmon as follows:

The barbarities of the transatlantic cattle traffic were described in language glowing with indignation and horror, the cruelties were

George C. Faville
as he appeared in 1900

exaggerated and multiplied, atrocities were described that never were committed, and illustrated pamphlets were prepared and circulated in order that the full power of sensationalism might be invoked. As a result of this agitation, a bill was presented to the British Parliament to prohibit the importation of live cattle from beyond the seas, and the Queen was strongly urged, in the name of humanity, to use her influence to secure its passage.

This emergency was met by the act of March 3, 1891, authorizing the Secretary of Agriculture to enforce necessary regulations to secure the safe carriage and humane treatment of cattle exported from the United States. Careful investigations were at once made by the Bureau of Animal Industry and regulations formulated which were acceptable to the British Government. . . . Magnificent iron cattle-ships were constructed, with permanent fittings, and having all the comfort, convenience, and safety which human ingenuity could provide. The losses of cattle in transit were soon reduced to the minimum of about one-third of 1%. The cattle were unloaded in as good condition, as vigorous and healthy as they were when they went on board. As a result of the improved conditions, and the greatly diminished losses, insurance rates were reduced from $8 and upwards per head of exported cattle to less than $1 per head. This saving of insurance alone, with an

average exportation of 325,000 head, amounts to $2,275,000 per year, nearly three times the entire cost of maintaining the Bureau.

In the reorganization of the Bureau in 1891 an inspection and quarantine of imported animals was provided at three stations on the Atlantic coast—Boston, New York and Baltimore. Within a decade these stations prevented the importation of foot-and-mouth disease on several occasions and stopped an importation of contagious pleuropneumonia. Of the need for this inspection of imported animals Salmon wrote:

It was only the realization that pleuropneumonia had been allowed to spread to a considerable though unknown extent among our herds, and had caused serious restrictions to be placed upon our export cattle trade, that led our Government to take even this first step for the protection of American live stock. We had taken the risk of importing the most destructive plagues for years without giving them much thought. Our people, always bouyant and optimistic, and never willing to consider danger or admit the possibility of trouble until it is upon them, could not be induced to guard against the danger to which they were exposed until they had actually experienced some of the inconvenience and loss which come from the neglect of such precautions. The establishment of quarantine stations furnished the necessary means to exclude further importations of contagion, and permitted us to undertake the eradication of pleuropneumonia with confidence that when the existing centers of the disease had been discovered and stamped out we should not be troubled by new outbreaks caused by imported cattle.

Up until the beginning of the 20th century the Bureau was almost the sole source of biologic products for the detection or prevention of disease in animals. Tuberculin and mallein were produced for regulatory officials and blackleg vaccine for the cattle industry.

By the end of the century the Bureau had expanded to employ about 285 veterinarians, about 260 assistant microscopists (all women) and a much larger number of stock examiners, taggers, and other technical and non-technical employees. Its work was organized under seven subdivisions—Inspection, Pathological, Biochemic, Zoological, Dairy, Experimental Station, and Miscellaneous—and was engaged in following activities:

Warren J. Fretz
as he appeared in 1900

I. Control of Contagious Diseases of Animals in the United States
   1. Eradication of pleuropneumonia (completed)
   2. Control of Texas fever
   3. Control of sheep scab

II. To Prevent Importation of Contagion
   1. Quarantine at Atlantic ports
   2. Inspection and quarantine along Mexican and Canadian borders
   3. Tuberculin tests of cattle in Great Britain and Canada

III. To Prevent Exportation of Contagion
   1. Inspection of exported live stock

IV. Meat Inspection
   1. Ante- and post-mortem inspection of interstate and export meat
   2. Trichinae inspection

V. Investigation of Diseases and Remedies
   1. Texas fever
   2. Hog cholera
   3. Sheep scab dips
   4. Tuberculosis
   5. Rabies
   6. Other contagious and non-contagious diseases, so far as facilities permit.

VI. Cooperation to Prevent Disease
   1. Supplying tuberculin to state authorities
   2. Supplying mallein to state authorities and to War Department

VETERINARIANS IN THE B.A.I. DECEMBER, 1900, AND DECEMBER, 1940

Name and Address	Date of Appointment	Present Assignment	Date due for Retirement
Walter J. Stewart Berkeley, Calif.	June 15 1896	In Charge Serum-Virus Control	Dec. 31 1942
John R. Mohler Washington, D. C.	Jan. 21 1897	Chief of Bureau	May 31 1945
Wm. H. Smith Washington, D. C.	April 1 1898	Meat Inspection Division	Sept. 30 1941
Murray J. Myers Jersey City, N. J.	April 1 1898	Stock Yards Inspection	Feb. 28 1942
Walter E. Howe Sacramento, Calif.	April 11 1898	Inspector In Charge TB Eradication	Sept. 30 1941
Alexander E. Wight Washington, D. C.	Dec. 15 1898	Chief, TB Eradication Division	Apr. 30 1946
Daniel G. Shumway Rouses Point, N. J.	Apr. 12 1899	Field Inspection	July 31 1944
George E. Totten Washington, D. C.	July 14 1899	Ass't Chief, Meat Inspection Division	Feb. 28 1945
Harry K. Walter Pittsburgh, Pa.	Jan. 15 1900	Stock Yards Inspection	Jan. 31 1942
Burton R. Rogers Chicago, Ill.	June 1 1900	Meat Inspection	Nov. 30 1941
Emerson J. Cary St. Joseph, Mo.	June 1 1900	Interstate Inspection	May 31 1942
Roy E. Jackson Montgomery, Ala.	June 15 1900	Inspector in Charge TB Eradication	Feb. 29 1944
John B. Hollenbeck Columbus, Ohio	June 25 1900	Hog Cholera Control	Dec. 31 1942
Warren J. Fretz St. Paul, Minn.	Sept. 1 1900	Inspector in Charge TB Eradication	Oct. 31 1947
Warner W. Worcester Sacramento, Calif.	Sept. 1 1900	TB Eradication Division	Sept. 30 1943
A. M. Blackwell Portland, Ore.	Oct. 17 1900	Interstate Inspection	
William M. MacKellar Washington, D. C.	Dec. 27 1900	Tick Eradication and Special Diseases	Mar. 31 1948

3. Supplying blackleg vaccine to cattle owners
4. Enforcing tick fever quarantine.

VII. To Aid Exports

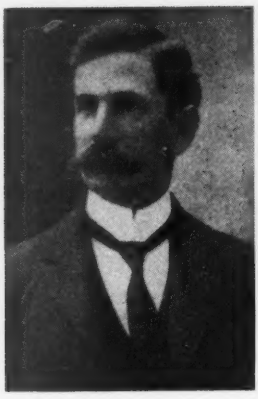
1. Trichinae inspection
2. Inspection of live animals for export
3. General inspection of meat for export
4. Inspection and control of cattle fittings on steamers carrying animals for export
5. Experimental shipments of butter, cheese and eggs
6. Publication of bulletins on American live stock and their products

VIII. Collection of Information

1. As to diseases
2. As to breeds, breeding and feeding
3. As to the dairy industry
4. As to the condition of the animal industry

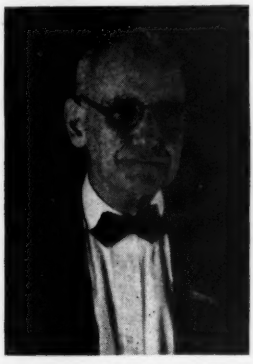
Of the approximately 300 veterinarians who were in the Bureau at the close of the century, December 31, 1900, but 17 are on the active list at the present time. Their names, addresses, date of appointment and present assignment are given in the accompanying table.

1900
Alexander E. Wight
1940



1900
Orlando B. Hess
1940

1900
Burton R. Rogers
1940



There are other veterinarians still living who were in the Bureau before the close of the last century, but they have resigned or been retired and are now engaged in school work (Cotton, Crossman, White, Klein), municipal food inspection, biologic production (Hess, McFarland, G. A. Johnson), in private practice, or in other vocations. Two of the 19th century B.A.I. veterinarians have retired within the year—Edgar A. Crossman, appointed July 1, 1900, retired May 31, 1940, and Leslie J. Allen, appointed July 1, 1900, retired November 30, 1940.

The oldest B.A.I. veterinarian of the 19th century is probably G. W. Browning of Mobile, Ala. Doctor Browning was appointed assistant inspector in the Bureau April 5, 1900, but resigned many years ago and has since practiced at Mobile. He is now in his 86th year. Of veterinarians still living the one whose appointment in the Bureau was earliest is probably George C. Faville. Doctor Faville was appointed April 21, 1887. He lives at Emporia, Va.,

and was 84 years old November 24, 1940. Dr. Burton R. Rogers was the youngest veterinarian in the Bureau at the close of the century and now, after 40 years, is the oldest engaged in post-mortem inspection.

Chief Salmon at 50 was the eldest veterinarian in the Bureau in 1900 both in years and in the period of service. However, although the Bureau was a relatively new department, many of the employees not veterinarians were veterans of the Civil War and more than 60 years of age. George Sutherland, a Stock Examiner born in 1826, was probably the oldest employee of the Bureau at the close of the century.

It is of interest to note that of the six veterinarians who resigned from the Bureau in 1900, three, Tait Butler, Louis A. Klein and John H. McNeil, left to engage in college work at the Kansas State College, University of Pennsylvania and Iowa State College, respectively; and the others, John G. Slee, Clinton H. Bugbee and Samuel Glasson Jr., resigned to enter military service. Doctor Bugbee reentered the Bureau service after the Philippine War, retired a few years ago, and is now head of the municipal meat inspection of Phoenix, Ariz.

During the first decade after the Bureau was established, appointments to it were made without examination, but in June, 1894, Bureau employees were placed under the Classified List and subsequent appointments to its ranks were made only after applicants had passed a civil service examination. The first examination for veterinarians was held in June, 1894. John Forbes, M.R.C.V.S. was the first veterinarian appointed under civil service regulations. He was appointed August 11th, and assigned to the position of Inspector in Charge at St. Joseph, Mo. He held this position till his death 10 years later. As he had been in the Bureau three years, it was necessary for him to resign his original appointment to accept the civil service position.

The Bureau of Animal Industry, U. S. Department of Agriculture, did a grand work during the first 16 years of its existence. Many important duties were committed to it—educational, protection of property, preservation of our export trade, alleviating animal suffering, guarding the public health, and research. Immeasurable credit is due its first Chief for guiding it during the critical years of its development and for keeping it, regardless of its varied activities, first of all a scientific organization and secondly, essentially a veterinary organization. Many experts in varied lines of science and a vast group of lay employees were included in the organization, but always as auxiliary to the professional veterinary service, which occupied the directing role. The Bureau failed only in exploiting its achievements and winning the public recognition it so richly merited. Perhaps this was inevitable because of the modesty and retiring disposition of the Chief. That he was aware of this lack of appreciation on the part of the public is shown by the following, which he penned as the century was drawing to a close:

> There are comparatively few persons who know of the great work which this Bureau has accomplished in scientific research, in the eradication of animal diseases, in guarding against the importation of exotic plagues, in preserving our export trade in animals and animal products, in opening new markets for these products in foreign lands, and, above all, in protecting the health of our people by the condemnation and destruction of diseased meat. This work is so widely distributed and is carried on so quietly without ostentation or display that it has not attracted the public notice which its importance deserves.

In 1924, Dr. U. G. Houck, writing of the early history of the Bureau, aptly said:

> A Bureau of Animal Industry became a national necessity by 1884. The horses, cattle, sheep and hogs on the farms of the United States at that time were valued at more than two and one-half billion dollars. This large national industry had been neglected, both by National and by state governments. Destructive animal diseases were spreading, and unorganized veterinary opposition was not making satisfactory progress in coping with them.
>
> . . . . . .
>
> Among the workers of the Bureau, past and present, many earnest, energetic, capable men and women have devoted all the useful years of their lives to this branch of the public service. Love for their work has imbued and held them rather than the inadequate remuneration which they received.

xperience with Brucellosis Vaccination

E.A.Jenkins, Shelbyville, Illinois

Presented at the
st Annual Veterinary Conference
University of Illinois

The results of clinical field experience extending over a period of 13 years have firmly convinced me that Bang's disease can be controlled by vaccination and that the test-and-slaughter plan is unnecessary. I do not condemn blood testing, for without it we should not be able to determine definitely the value of vaccination.

When a client comes to the office of his veterinarian and tells him that within the last few weeks he has a few of his best cows abort, that client feels reasonably sure in his own mind that he has infectious abortion in his herd. The first question that arises in the mind of the practitioner is—what can be done for this client? What can be done that will save the valuable animals that he has built into a profitably producing herd through heavy investments of money and years of effort? This man wants his veterinarian, in whom he is placing his confidence, to stop the economic loss. He is facing disaster and he seldom asks the price. He wants a service that will enable him to continue in the dairy business and he is willing to pay a reasonable fee for such help.

The problem is left on the veterinarian's doorstep. His is a chance to make good or fail. His client is flesh and blood with individual characteristics; the herd is an entity with its own peculiarities; the problem is unique. Nowhere are these three factors exactly duplicated. The regulatory officials do not and cannot understand the practitioner's problem in this matter. To them the client is a signature on an application blank; the herd a number in a long column, and the problem an average that nowhere exists as an actuality.

If the practitioner has kept himself informed and has been a keen observer, has the confidence of his client, and has an intimate clinical knowledge of the herd and of other herds in the community, he is in an excellent position to direct the procedure necessary to put this herd on a paying basis and keep it there. A conscientious practitioner, then, will do the thing that study and clinical experience has taught him is the best for his client. That procedure is not always the same. Every herd is a distinct problem.

One piece of advice the practitioner can never give his client is to blood test his herd, eliminate all reactors, retest, and eliminate until a Bang's disease-free herd is obtained; thereby leaving a susceptible herd wide open to future attack and the possibility, the almost certainty in a large commercial herd, of another costly process of testing and elimination and so on, *ad infinitum,* or *ad libitum,* or perhaps it is *ad astra per aspera*—in any case, eventually *ad* bankruptcy.

The advice of the practitioner to his client should be to build an immune herd that will resist the invasion of *Brucella*

abortus. This is possible. My procedure for the last eight years has been first to blood test all animals in the herd above four months of age. That gives me information that helps to interpret the history of the herd and the clinical findings, which includes in dairy herds an examination of the milk and of the udders.

CATTLE CLINIC, 21st ANNUAL VETERINARY CONFERENCE, UNIVERSITY OF ILLINOIS, OCT. 22-23, 1940
In the front row will be noted Drs. A. C. Tillman (left), Earlville; A. J. Pilon, Champaign; H. W. Leib, Winchester; W. A. Wilkin, Centralia; A. F. Schalk, Columbus, O. (center with light hat), and the owner of the cattle (extreme right)

If there is a large percentage of reactors I recommend vaccination of all animals above four months of age. If there are only one or two reactors, unless they be of unusual value or promise, I recommend disposal of them and vaccination of all unbred heifers more than four months of age. Following this I make an annual blood test of all animals in the herd as long as unvaccinated animals remain in it.

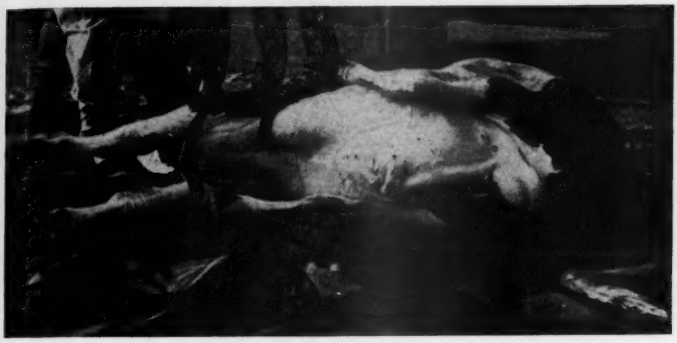
In beginning to clean up a herd I vaccinate yearlings and two-year-olds with a 10cc dose of vaccine. In a herd with a large percentage of reactors that are good producers and are possibly delivering normal calves, I recommend keeping such animals until they are no longer profitable or until replacements of vaccinated, immune animals are available from the herd.

If vaccination is followed diligently and systematically the disease can soon be eliminated from a herd without the slaughter of any profitable animals. I like to continue annual blood testing in such a herd for the information it gives me. If such a program is started and when the trouble stops vaccination is discontinued, sooner or later the fire will break out and burn to the water line, i.e., to the animals that have been vaccinated. I have seen this happen repeatedly.

We have often read that calfhood vaccination is still an experiment. Most of such statements come from agricultural officials, county advisers, agricultural colleges, and agricultural college research laboratories. We wonder why it should be called an experiment. Experimental and field work with calfhood vaccination against Bang's disease with cultures of low virulence has extended over a period of more than 12 years. A large amount of information as to its value has been accumulated. It has been definitely proved that there is no danger in producing permanent infection when vaccinating young animals, and that a workable measure of immunity is produced for a period the length of which has not yet been determined, but which is known to be sufficient for practical control of brucellosis in any commercial herd.

I have made blood tests on cows several years after I have vaccinated them as yearlings and found them still negative. In fact, I have never found a reactor cow that had been vaccinated as a calf; and according to the literature very few have been found by anybody, that have reacted as a

result of natural exposure. Cows that have been vaccinated usually do not become permanently positive to the agglutination test. It is most unfortunate that officials have would discontinue dairying and follow some other branch of farming. They know the test-and-slaughter plan from experience, and from the same teacher have learned



One of the clinic subjects at the Illinois conference; umbilical hernia in a Holstein bull

Dr. E. R. Frank, Manhattan, Kans., operating on the bull with umbilical hernia. Assistants: Dr. J. A. Henderson (standing), U. of I., and Dr. L. E. Boley (squatting), U. of I. Drs. A. J. Coale, Carmi (left); Harry Caldwell, Wheaton; Walker France, Boonville, Ind., and others watch the operation

been so slow to recognize the value of abortion vaccine.

The test-and-slaughter plan has long been obsolete. Through its use too many valuable animals have been, and are being, unnecessarily slaughtered, thereby causing great economic loss to the owners. These valuable animals could have been maintained as profitable producers in the herd and the owners could have been spared heavy financial losses had officials recognized the value of abortion vaccine. Many dairymen in my district if compelled to maintain their herds without vaccination the value of vaccination. They know it takes the hazard of abortion out of their business.

It is nonsense to contend that vaccination perpetuates the disease in a herd, for practical experience long since proved that this is not true. There are innumerable Bang's disease-free herds that have been built by vaccination systematically carried out by competent veterinarians for practical farmers. Further, no one knows how many of the herds that are listed as having been freed from the disease by the test-and-slaughter plan and kept clean by the

sanitary regulations embodied in the plan, in reality have been preserved from reinfestation by "unofficial" vaccination; but common observation indicates the number

POULTRY CLINIC, 21st ANNUAL VETERINARY CONFERENCE, UNIVERSITY OF ILLINOIS

Lesions of parasitism, leucemia, cholera and pullorum disease were demonstrated. Left to right: Drs. T. M. Baylor, Bloomington; H. N. Holmes, Mt. Sterling; W. A. Wilkin, Centralia; and Jesse Sampson, U. of I., demonstrator

is very large. There is another thing no one knows, and that is just how appalling an outbreak of brucellosis may be in a herd that by good fortune is kept wholly free from the infection for one complete generation and then infected. In that respect the test-and-slaughter plan is truly an experiment that I think no advocate wants to see concluded.

In my practice in herds where as many as 50% of the cows had aborted and a large number showed positive reactions to the agglutination test, remarkable results have been achieved by vaccination. The procedure followed was to vaccinate all cattle in the herd above the age of four months no matter whether open or pregnant and without regard to the stage of pregnancy, and to vaccinate the calves from then on as they reached the age of five or six months. These herds have been found to be practically Bang's disease-free when submitted to tests three, four and five years later, the only exceptions being a few old cows that continued to react but did not abort and in some instances continued year after year to be the most profitable animals in the herd.

As a case in point I will cite my own herd. In caring for them I gained much valuable information, for I observed every phase of Bang's disease and was unhampered in treating it. In 1935 I had 42 head of cattle on my farm. Among them were 17 heifers due to calve from October until January. Ten of the 17 aborted between September and January. To make matters worse, in October cows that had been kept in a pasture separate from the heifers began to abort.

December 5, 1935, I vaccinated 24 calves and supposedly open heifers. Unknown to me four of these heifers had been bred. These four delivered normal, healthy calves. I did not vaccinate the heifers and cows I knew to be pregnant. Among these were nine extra good Holstein cows due to calve that winter. Two of these aborted. Seven delivered living calves, that died within four days.

A few weeks later I vaccinated a number of pregnant cows ranging in gestation from one to four months. These cows delivered normal calves that lived. This was proof to me that vaccination was not injurious to pregnant animals. No doubt had I been handling an experimental herd in a research project, this experience would have been far from convincing; had I been a regulatory official it would have been just another of the much-advertised swallows that do not make a summer. But striking me as this experience did right in the pocketbook, it carried a tremendously convincing wallop. However, I do not have to depend upon it now to prove the usefulness of vaccination for the control of brucellosis in cattle, for I have been actively using this means for the control of this disease all over my territory for the past five years with uniform success.

Last week a blood test run on my herd showed that five cows are reactors. These animals have always been reactors and probably will be as long as they remain in the herd—which will be just so long as they continue to be profitable producers. Three of these reacting cows have stood at the top

SWINE CLINIC, 21st ANNUAL VETERINARY CONFERENCE, UNIVERSITY OF ILLINOIS
Left to right: Fred Hecker, Cutter Laboratories; Dr. E. E. Kelsey, Eureka; Dr. H. R. Hester, U. of I., demonstrating the lesions of swine erysipelas; Dr. L. T. McClure, Gurnee; Dr. C. A. Metz, Walnut; and Dr. H. N. Holmes, Mt. Sterling

of the herd in the Shelby County Dairy Herd Improvement Association since 1936, when they were blood tested, found to be reactors, and vaccinated. The other two of the five reacting cows in my herd have always been profitable producers as shown by the Association record, and for that reason have been retained. None of the five has ever aborted or suffered from any udder trouble.

Had I followed the test-and-slaughter plan, these valuable animals would have been sacrificed at heavy expense. And to what end? They have proved harmless to the other animals in the herd.

In my recent blood test I found that six other cows that were vaccinated as mature animals are positive to the agglutination test at 1/50 and negative at 1/100 and 1/200, in other words are suspects. The remaining animals in the herd, which now numbers 66, are all negative.

Since December 5, 1935, when I first began vaccinating, there have been six abortions in the herd. Three of the cows that aborted were negative on blood tests; two were reactors, and were eliminated for the reason that up to that time they had not been profitable animals, and unless they had done better would have been eliminated, abortion or no.

Since this was my own herd, I have been able to observe it more closely than I might otherwise, but it serves only as one example of many in my practice that have convinced me of the value of vaccination in the control of abortion disease in commercial dairy herds. I have also had ample opportunity to observe the difficulty commonly encountered in keeping a highly susceptible dairy herd free of the disease in an intensive dairy district.

My experience and observation and the published reports of others, including some of those who have conducted valuable research into the problem of abortion disease of cattle, justifies the following statements:

1. The administration of abortion vaccine made from B. A. I. Strain 19 to adult cattle is not harmful.

2. The use of vaccine in the adult non-reacting animal is more justifiable than in the reactor, as they may have established their own immunity—probably have done so if they are regular breeders.

3. Vaccination is a safeguard to the owner and is one of the most economical practices he can follow. Establishing immunity in his herd is his insurance against the ravages of one of the most financially ruinous diseases of dairy animals.

4. Present statistical data proves conclusively that vaccine produces no harmful results. The reproductive efficiency of animals is increased, and the injection of vaccine has no appreciable effect on milk production.

5. The vaccine should be available only to those who are trained to use such products. The owner of an infected herd needs some expert help close at hand, and a hypodermic syringe does not constitute such help.

By the systematic use of vaccine many herds that formerly contained a large percentage of reactors are now complying with board of health regulations, without having sacrificed a single profitable animal.

I feel certain that the federal Bureau of Animal Industry and research laboratories in the state agricultural colleges will be forced in time to do a right-about-face and recognize the value of abortion vaccination for both calves and mature animals.

There is too great a tendency among officials to disregard clinical field experience. In the last analysis it is always clinical field experience that determines the value of any method of disease control. There is no other arbiter. The most classic research stands or falls not upon its own findings, but upon the verdict of clinical use.

E. R. Frank, Kansas Cecil Elder, Missouri Frank Breed, Nebraska

Three stalwarts on the program of the 21st Annual Veterinary Conference, U. of I.

It is certainly to be hoped that Bureau officials in Washington will in the very near future recognize more fully the value of abortion vaccine. I may have been too critical in what I have said of the failure of officials to recognize the value of abortion vaccination, but some allowance must be made for the attitude of a practitioner who has practiced for many years in the same community, and whose clients' fathers were in many instances also his clients. Under such circumstances their unnecessary losses become of great personal concern to him, and incline him to speak harshly of those he regards as responsible for them.

However, I am confident that the value of vaccination is being so widely and clearly recognized by practitioners and cattle owners that officials will be forced to formulate a plan that will utilize it and eliminate the present costly procedure of test and slaughter.

The Bemis Method of Enucleation of the Eye in Horses

Several methods for removal of the eye were tried before the late Doctor Bemis introduced his method. Results were very unsatisfactory, either because of recurrence

Fig. 1

of the growth or because of the flowing of tears over the side of the face from which the eye was removed.

The indications for this operation are mainly tumors involving the globe and having their origin in the membrana nictitans. Such tumors are soft, bleed easily, attack all structures of the orbit and unless completely removed reappear rapidly.

Previous to using the Bemis technic I performed this operation only two or three times a year, not because there were no indications for performing it more frequently, but because the results were unsatisfactory. I now do this operation 15 to 20 times a year and have not had one bad result.

Bemis performed most of his operations under local anesthesia. This I find is quite satisfactory, but I also like to give the animals 300 to 400cc of a 7% solution of chloral hydrate into the jugular vein. With the local anesthetic plus the general sedative, accurate surgery can be done. Any local anesthetic may be used, but I prefer cocaine in adrenalin.

The operation is performed exactly as Bemis performed it. The upper and lower lids are sutured after antiseptic cleansing, and cocaine is injected through the lids into the structures of the orbit (Fig. 1).

The incision is made through the lids but not through the conjuctiva (Fig. 2). There is practically no hemorrhage until the large artery at the back of the globe is cut; this will subside under pressure pads. When bleeding has been controlled I flush the cavity with BIPP and stitch the wound, leaving at the medial canthus a small opening into which I plug ribbon iodoform gauze soaked in BIPP into the wound with a gauze packer.

The gauze is removed in 24 hours and the socket again flushed with BIPP. From this time until the wound has healed, cold

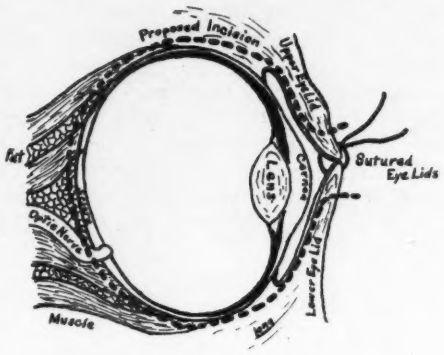


Fig. 2

Diagrams by E. I. Long

water from a faucet is run over the eye three times a day for 10 minutes. This is the only aftertreatment. The eyelids are completely sealed in two to three weeks. There is usually somewhat of a sunken appearance of the socket, but no signs of growth, discharge, or destruction of the hairs of the face from tears.

Several practitioners have asked me if I have had recurrence of the growths after the removal. I have on two occasions had a recurrence; one in which the bony portions of the orbit were attacked and I deemed it advisable to destroy the animal, the other in which secondary formation had taken place—due, I think, to incomplete removal of the primary growth. This latter recurrence would not have taken place had I made a clean sweep of the cavity and removed the periorbital fat, which was involved in this case.

This operation has been the means of saving many animals that would previously have been destroyed.

WILLIAM M. NIELSEN
Cessnock, N.S.W., Australia

Phenothiazine as an Anthelmintic For Horses and Mules*

By B. J. ERRINGTON and CLIFFORD WESTERFIELD, Lexington, Ky.
Department of Animal Pathology
Kentucky Agricultural Experiment Station

FOLLOWING the first reports on the use of phenothiazine as an anthelmintic for swine [1] and sheep,[2] its remarkable efficiency and apparently low toxicity encouraged investigations of its efficiency in other species. Experiments with horses have been conducted by the Zoological Division of the Bureau of Animal Industry,[3] by English workers,[4] and by the Division of Veterinary Science of the University of California.[5] Prior to the publication of the results of these studies, numerous inquiries were received at this institution concerning the efficacy, tolerance, dosage, cost and method of administration of phenothiazine to horses and mules. Preliminary tests were therefore undertaken on the horses and mules that were available at the time. In all, 55 animals were treated. These varied in age from suckling foals to aged horses and mules. Commercial phenothiazine furnished by the Dupont Chemical Company, Wilmington, Delaware, was used for all animals treated.

Methods

It was planned to estimate the efficiency of phenothiazine by making fecal egg-counts before and after treatment, and to observe the tolerance of the animal for the necessary dose. Blood examinations, which were not considered in planning the experiment, were made on two yearlings because they remained in poor condition after receiving the drug and being placed on excellent new pasture. These two animals were found to have a low red-cell count. Therefore, it was decided to make blood examinations on others already treated and on the few remaining to be treated.

The drug was given, with few exceptions, in the grain feed which the animals had been accustomed to receiving. No period of fasting was carried out. Animals that were receiving a mixture of corn, oats and bran ate the grain-drug mixture more satisfactorily in a wet mash than in dry feed. The only other grain feed which animals in the test had been receiving contained molasses. These animals ate the grain-drug mixture as well dry as in a wet mash. Most of the animals did not eat their usual grain mixture readily when it contained phenothiazine; therefore the drug was given in the evening feed and allowed to remain before them until morning.

In column 6, Table I, is recorded the percentage of the drug eaten before the next feed was given. That portion remaining was mixed with fresh dry grain of the next feed. The drug-grain mixture had, of course, dried out and in some cases some of the drug remained in the feed box even after the second feed. The animal eventually got most of the drug but there was a variable loss in the feed spilled from the feed boxes. Only two animals refused to eat the grain-drug mixture. Neither of these cases are included in Table I because in one case, No. 3, it was the second dose of the drug that was refused and in the other case it was estimated that only a small part, if any, of the mixture was eaten. These two animals were later given the drug in gelatine capsules. The four sucklings, varying in age from 64 to 96 days,

*The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the Director.

[1] Harwood, Paul D., A. C. Jerstad and L. E. Swanson, 1938. The efficacy of phenothiazine for the removal of ascarids and nodular worms from swine. *Jnl. Parasit.* 24:6, suppl. pp. 16-17.

[2] Harwood, Paul D., R. T. Habermann and A. C. Jerstad, 1939. Efficacy of commercial phenothiazine in the removal of roundworms from sheep. *Vet. Med.* 34:7, pp. 440-443.

[3] Harwood, Paul D., R. T. Habermann, E. H. Roberts and W. H. Hunt, 1940. Preliminary observations on the effectiveness of crude, unconditioned phenothiazine for the removal of worms from horses. Proc. Helminth. Soc. Wash. 7:1, pp. 18-20.

[4] Symposium on Phenothiazine, 1940. *Vet. Rec.* 52:36, pp. 638-639, 642-643, 654-656, 660-664.

[5] Howell, C. E., and J. W. Britton, 1940. A field trial with phenothiazine as an equine anthelmintic. *Cor. Vet.* 30:4, pp. 526-532.

were given the drug by means of a stomach tube and a funnel. The phenothiazine was washed through the funnel with water.

Results

A total of 55 horses and mules was treated with phenothiazine. The counts of the strongyle eggs in the feces, before and after treatment, are summarized in Table I. Not all the animals treated are included because in the unrecorded cases only a limited number of fecal examinations were possible. In the latter cases there were no apparent contradictory results.

Animals at Hard Work Exhibited No Untoward Effects From Administration of Phenothiazine

Stoll's dilution technic of egg counting was carried out on a certain number of cases before treatment, as indicated in Table I. All other examinations were made by the sugar-flotation method. In the sugar-flotation technic the same bulk of feces, approximately 45gm, was used. This seemed to be as accurate as weighing the feces, as in the latter method there seemed to be a considerable difference in bulk depending upon the moisture content. The sugar-flotation samples were centrifuged for five minutes in 4½x⅝ inch test tubes and the surface material removed with a wire loop 10mm in diameter. All the eggs in the loopful were counted. In those samples where the eggs were too numerous to count accurately without further dilution, they were recorded as 4+. In Table I the results of fecal examinations after treatment are recorded as being made every seven days after the first week. This was the usual routine, although in some cases they were made one or two days either before or after the recorded date.

Results indicated that repeated fecal egg counts by the sugar-flotation method gave a comparatively accurate estimation of the degree of infestation. Stoll's technic required considerably more time than the sugar-flotation method. In light infestations the larger quantity of feces used in the sugar flotation seemed responsible for more consistent counts in repeated examinations. In heavy infestations Stoll's technic was a more accurate criterion of the exact degree of infestation.

Because Nos. 1 and 2 had been given oil of chenopodium 23 days before treatment with phenothiazine, their egg count was not considered. They were the first two animals to which the drug was given and are included because one of them, No. 1,

TABLE I. Result of Fecal Examination for Strongyle Eggs Before and After Treatment with Phenothiazine

Animal	Age in yrs.	Egg count before treatment		Dose of drug in gms.	Drug consumed on 1st feed %	Egg count after treatment (on days indicated)												
		2nd day	1st day			1	2	3	4	5	7	14	21	28	35	42	49	56
1. Tb.	1	S 500	S 600	60	75							0		11	3	13	29	
2. G.d.	1	S 0	S 700	60	75							1		0	5	58	63	69
3. Tb.	1	S 200	S 300	90	100	S 100	S 0	S 0	0			0	2					
4. S.b.	1	S1100	S1700	60	100	S1100	S100	S100	0			0	0	153	1027	0	0	
5. G.d.	1	S 600	S1100	60	100	S 800	S 0	S 0	0			0	0	75	71	0	0	
6. G.d.	1	S 100	S 100	60	75		S 0	S 0	0			0	0	7	1	4	1	
7. G.d.	1	S 300	S 0	60	100		S 0	S 0	0			0	3	1	2	6	16	
8. Tb.	1	271		45	100	120	0	0	0			1						59
9. Tb.	1	125		45	100	189		0	0			1				33		85
10. S.b.	3	280		45	100	179	2	0				1				20		152
11. Tb.	12	++++		45*	100	90	119					1				16	++++	
12. S.b.	8	15	++++	45*	100							0				204	333	
13. Mule	18	S2900	280	60	25	220	++++	608	36	104	13	0		1	1	4	3	
14. Mule	25	50	S1000	60	50	250	15	461	4		1	3		1	0	0	10	
15. Mule	6	S 900	260	60	80	400	65	1	4	9	2	2		1	1	2	14	
16. Mule	6	90	300	60	100	284	95	2	0	1	0	1		0	0	16	0	
17. G.d.	14	309	136	60	100	70	16	0	0	0	0	1		0	0	3	110	
18. G.d.	14	289	S1500	60	95	386	0	1	0	0	0	0		0	0	0	2	
19. Mule	7	S2500	S2100	60	95	631	74	4	0	0	0	0		4	0	18	153	
20. Mule	7	S2600	S1900	60	100	483	16	2	0	0	0	0		0	2	4	31	
21. G.d.	12	225	S 700	60	100	150	12	1	0	0	0	0		0	2	2	38	
22. G.d.	3	218	S2500	60	95	509	38	60	0	1	1	0		0	2	91	++++	
23. Mule	9	S1300	++++	60	90	++++	4	3	0	0	0	0		1	0	9	29	
24. Mule	10	S1600	S2700	60	75	++++	60	173	16	2	5	0		8	3	86	132	
25. G.d.	4	S2600	283	60	100	508	239	3	0	0	0	2		0	23	++++	++++	
26. G.d.	4	S1100	267	60	100	++++	10	118	0	0	0	0		0	24	76	371	
27. S.b.	14	57	43	30	50	25	2	4	3	0	2							
28. S.b.	13	S 400	355	30	90	203	0	0	0	0	0							
29. Tb.	1	S 500	412	30	95	278	1	0	0	2	3							
30. Tb.	1	S 800	440	30	75	53	8	0	1	0	0							
31. Tb.	1	S 800	++++	30	90	286	13	20	0	1	0							
32. Tb.	19		++++	30	100	64	1	1	9	3	30							
33. Tb.	8		++++	30	100	194	6	2	2	12	39							
34. Tb. ..... Su.			++++	10	100				1			1						
35. Tb. ..... Su.			174	10	100				16			18						
36. Tb. ..... Su.			58	10	100				1			3						
37. Mule .... Su.			350	10	100				0			35						

Tb.—Thoroughbred. G.d.—Grade draft. S.b.—Saddle-bred. Su.—Suckling.
*—Divided into three equal parts and given on three successive grain feeds. Egg counts preceded by S are by Stoll's method. All others are by sugar flotation technique.

later had a low red-cell count. No. 1, which weighed 610 pounds, was slightly smaller than the average thoroughbred yearling which was treated.

The second group, Nos. 3 to 7, were normal animals except No. 3, which was a wobbler. Although this animal was given 90gm of phenothiazine, his egg count did not become negative sooner than other animals in the group, which received only 60gm. Nor did it remain negative longer than the other animals. It is difficult to understand why Nos. 4 and 5 had relatively high egg counts at the 4th and 5th week after treatment followed by negative counts at the 6th and 7th weeks. In all other animals treated in this experiment the egg count indicates that the infesta-

tion was either eliminated or materially reduced. This was followed in most cases by a gradual rise in the egg count beginning from four to six weeks after treatment. In most cases the decrease and increase in egg counts were quite gradual. The number of negative or reduced egg counts during the period following treatment, indicated in Table I, would seem to be sufficient to indicate the efficacy of the drug.

Group 4, Nos. 13 to 26, were all farm work horses and mules in one barn. Those animals in this group whose egg counts were not negative four days after treatment had not eaten the grain-drug mixture readily. However, all except one, No. 15, had at least one negative egg count between the 4th day and 7th week following treatment. Ten of the 14 animals had negative egg counts four days after treatment. Eight still had negative counts after one month, with four showing an occasional egg during this time. From the results in this group it would seem that two ounces of phenothiazine is a sufficient amount for animals of this size. The largest of these work animals, No. 21, weighed 1,625 pounds. The egg counts on the younger animals, Nos. 22, 25 and 26, were the first to increase to a moderate or heavy infestation following a period of negative counts.

Group 5, Nos. 27 to 33, were given 30gm each of phenothiazine. Nos. 27 and 28 were saddle-bred mares weighing about 1000 pounds. Nos. 32 and 33 were large thoroughbreds weighing about 1,200 pounds. The others were yearling thoroughbreds. From the results it would seem that one ounce of phenothiazine is the minimum dose necessary for yearling thoroughbreds and animals slightly larger. It may be a sufficient dose for animals of this size if they are dosed in such a manner that they receive the entire amount of the drug.

Ten grams of phenothiazine given to four thoroughbred sucklings, Nos. 34 to 37 in Table I, were less efficient than the larger doses for any of the other groups treated. A more accurate estimation of the results would have been possible with more frequent egg counts.

TABLE II. HORSES RECOVERING FROM EFFECTS OF PHENOTHIAZINE

Horse	Average erythrocyte count 4-8 weeks after receiving phenothiazine	Number of counts	Lowest erythrocyte count after receiving phenothiazine	Per cent of decrease
1	7,925,000	3	5,325,000	32.80
2	8,156,250	3	5,150,000	36.83
3	7,362,500	*3	4,825,000	34.46
4	8,620,500	3	6,600,000	24.43

Effect of Phenothiazine on the Blood

Total red- and white-cell and differential blood counts were made on Nos. 1, 2, 3 and 4 three weeks after the administration of commercial phenothiazine in doses as shown in Table I. The percentage of hemoglobin was also determined by use of the Dare hemoglobinometer. The total erythrocyte count in these four animals varied from 4,825,000 to 7,300,000 per cmm. The hemoglobin ranged from 40 to 60%. At the same time similar counts were made on three thoroughbred yearlings (Nos. 29, 31, and 154) and on an aged thoroughbred stallion (No. 32), which had not received phenothiazine. The red-cell count of all the yearlings was over 9,500,000 per cmm and of the stallion over 8,500,000 per cmm. The hemoglobin varied from 60 to 80% in the yearlings and was 90% in the stallion.

Total red-cell counts were repeated at weekly intervals in these two groups for a period of three weeks. Results of these counts are summarized in Tables II and III. It will be seen from Table II that the lowest erythrocyte count made on the horses after receiving phenothiazine was from 24.43 to 36.83% below the average of counts made from four to eight weeks following the administration of the drug, when the animals were apparently recovering from its effect.

It is seen from Table II that No. 3, which had previously been given three ounces of phenothiazine, had the lowest red-cell count. Three weeks after receiving the first dose a second dose of three ounces was given with the following results. The day previous to the administration of the second dose the red-cell count on this animal was 7,362,500 per cmm and the hemo-

TABLE III. VARIATION OF ERYTHROCYTE COUNT IN NORMAL HORSES NOT RECEIVING PHENOTHIAZINE

Horse	Average erythrocyte count	Number of counts	Lowest count	Per cent of variation	Highest count	Per cent of variation
29	8,696,071	7	7,650,000	12.02	9,537,500	9.68
31	9,857,500	5	9,525,000	3.37	10,762,500	9.18
154	9,609,062	8	9,050,000	5.81	10,175,000	5.88
32	8,608,333	6	8,287,500	3.72	9,625,000	11.81

globin was 75%. Two days after receiving the second dose, the erythrocyte count was 6,387,500 per cmm and the hemoglobin was 45%. On the fourth day the red-cell count had dropped to 5,687,500 per cmm and the hemoglobin to 40%. Nine days after the second dose was given, the red-cell count was 5,762,500 per cmm and the hemoglobin still 40%. On the 13th day the red-cell count was down to 4,875,000 per cmm and the hemoglobin remained at 40%. This animal's lowest erythrocyte count after receiving the second dose of phenothiazine was 42.05% below his reading of 8,412,500 per cmm, four weeks after receiving this dose.

TABLE IV. HORSES RECEIVING SINGLE ONE-OUNCE DOSES OF PHENOTHIAZINE

Horse	Average normal erythrocyte count	Number of counts	Lowest erythrocyte count after receiving phenothiazine	Per cent of decrease
27	6,950,000	2	5,400,000	22.30
28	6,737,500	2	6,662,500	1.11
29	8,696,071	7	7,125,000	18.06
30	9,050,000	2	8,625,000	4.69
31	9,857,500	5	6,862,500	30.38
32	8,608,333	6	8,425,000	2.12

A ninth horse, No. 157, which had not been previously treated, was given three ounces of phenothiazine. His normal erythrocyte count before treatment was over 8,500,000 per cmm and the hemoglobin was 75%. Three days after treatment the erythrocyte count had dropped to 6,287,500 per cmm and the hemoglobin to 40%. Six days after treatment the red-cell count was 5,462,500 per cmm and the hemoglobin was 35%. The next day, seven days after treatment, the animal was destroyed; at this time the erythrocyte count was 6,187,500 per cmm and the hemoglobin 40%. The variation below the normal erythrocyte count in this animal following the administration of three ounces of phenothiazine was 36.2%. According to results obtained in other horses, if blood counts could have been made 10 to 20 days after receiving phenothiazine, the erythrocyte count probably would have been as low as that of No. 3.

After the conclusion of the foregoing experiment, one of the control animals, No. 154, was given 48gm of commercial phenothiazine in equally divided doses over a period of six days. The red-cell count dropped from an average of over 9,600,000 to 7,300,000 per cmm and the hemoglobin ceiving the phenothiazine was 24.02% below to 40%. The lowest red-cell count after renormal for this animal.

The two other control animals and four other horses were each given one ounce of commercial phenothiazine in a single dose after normal erythrocyte counts were determined. It will be seen from Table IV that one ounce of phenothiazine did not materially affect the red-blood cell count in three of these horses; namely, Nos. 28, 30 and 32, in which the amount of decrease ranged from 1.11 to 4.69%. However, the other three animals displayed a decrease of red blood cells following the administration of the one-ounce dose. The decrease in these animals, Nos. 27, 29 and 31, ranged from 18.06 to 30.38%. These counts were over a period of three weeks following treatment.

The technic used in making the red-cell counts was uniform throughout in that all the counts were made by the same individual, using the same pipette and counting chamber. All the blood samples were secured at approximately the same time each day. The animals were cared for and managed alike throughout the course of the experiment.

Discussion

As estimated by fecal egg counts, commercial phenothiazine had a very high efficacy in the elimination of strongyles from horses and mules. In these animals there was an apparent decrease in the red-cell count and hemoglobin following the administration of the drug. This blood change was temporary in our cases and the animals treated suffered no other noticeable effects. The 14 farm animals in Group 4 continued in their heavy farm work without evident effects. The drug was given without untoward results to animals in poor condition. A thoroughbred brood mare suffering from chronic diarrhea developed abdominal pain following a dosage of one and one-half ounces but recovered promptly. However, until more is known concerning the effects following its administration some caution should be used, at least in the dosage.

Doses of from 30 to 45gm for yearling thoroughbreds and 60gm for farm horses and mules were quite efficient in our cases. In considering the dosage, as we administered the drug, it should be realized that there was some loss in most cases. There was some indication that giving the drug in divided doses might be advantageous and efficient. There is some question of the efficiency of this method of administration in Nos. 11 and 12 because of the small number of fecal examinations following treatment. No. 154, which was not included in Table I, because of a lack of repeated fecal examinations, had a negative fecal count after getting 48gm in six evenly divided daily doses.

Phenothiazine in the doses used apparently had very little effect upon the ascarids with which some of the animals were infested. Some of the mature worms were seen to pass in the feces but the egg counts were not materially reduced except in two out of eight cases. In those two cases of light infestation the egg count following treatment was negative for seven counts over a period of 53 days in one, and for 11 counts over 46 days in the other. One horse, No. 157, that was killed a week after having had 90gm of the drug, had many bots in its stomach. A 64-day-old suckling showed a moderate infestation of *Strongyloides westeri* five and 15 days following a dose of 10gm of phenothiazine. This foal had none of these eggs in his feces the day before treatment, at which time he had a count of 174 strongyle eggs by the sugar-flotation method. One yearling, No. 3, had two 90gm doses of phenothiazine one month and two months before autopsy. Another yearling received 90gm a week before autopsy. Both had moderately large aneurysms in the mesenteric arteries, with many live larvae. Phenothiazine was therefore effective only in the elimination of mature strongyles.

Conclusions

1. Phenothiazine is apparently highly efficient in the elimination of mature strongyles from horses and mules, as determined by fecal egg counts.

2. The drug has no effect upon bots, little if any effect upon strongyloides of suckling foals, and apparently is not altogether effective for ascarids of the horse.

3. Results indicate that one to one and one-half ounces for yearling thoroughbreds, and two ounces for mature thoroughbreds and average-sized farm horses, is a sufficient dose.

4. From data collected in these cases, it appears that commercial phenothiazine produces a decrease in total red cells and hemoglobin, which seems to be in proportion to the amount of drug received. The erythrocyte count returned to its previous level in about four weeks.

Tetanus in Lambs

Castration and docking are profitable operations, since lambs so operated upon, bring when marketed one to five dollars more per hundred pounds than otherwise. This advantage is offset, however, if the operator does not observe asepsis, since mortality after infection with tetanus is 95% to 100%.

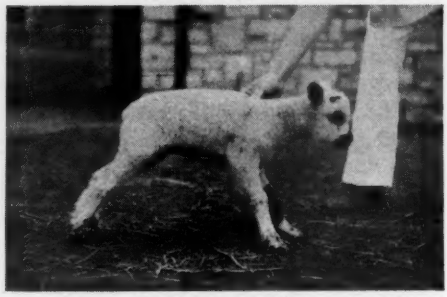
Of the common ailments of sheep, pseudotetanus ("stiff lamb") and strychnine poisoning are of importance from a differential standpoint. The former occurs only on pasture, the membrana nictitans does not come out over the eyeball, and spasms are not evoked on percussion, as in tetanus. In strychnine poisoning, spasms develop much more rapidly and are interrupted by periods of relaxation. Death occurs early.

Case Record.—A ewe lamb one month old was presented for treatment March 4th, 1940, with a history of having been docked three weeks previously. As is usually the case, barnyard filth and lack of asepsis entered into the picture. The owner described the symptoms as dullness, loss of appetite, and a peculiar stiffness. Examination disclosed that rigidity in the neck muscles resulted in inability to swallow. Characteristic of tetanus were the tonic muscle spasms, stilted gait, and inability to put the nose to the ground. Hypersensitivity and opisthotonos were prominent. The membrana nictitans covered the eyeball. Thin, light yellow feces suggested enteritis. A pulse of 85, temperature of 99.9° F., and respirations of 18 were recorded. Fecal examination was negative and complete urine analysis showed merely an increased specific gravity.

The patient was given 3cc of nembutal for its action as a physiological antidote. To combat absorption and increased intoxication of the nervous system a further portion of the tail was amputated. Hemorrhage was avoided by a ligature and a gauze dressing saturated with 1 per cent silver nitrate. Retention of urine was relieved by pressure over the bladder and the feces were removed by enema. Because of its paralytic action on motor nerve centers, rectal infusions of saturated solutions of magesium sulphate were made. One pint of milk was administered via stomach tube. After fashioning a sling for the animal, dark, quiet quarters were provided.

Death occurred on the second day after the operation. Post-mortem lesions consisted chiefly of hyperemia and punctiform hemorrhages of the spinal cord and its membranes. In addition, the nerves were infiltrated with small hemorrhages. As suspected, mild enteritis was also present. The ordinary mild, acute dilatation of the heart and passive congestion of the lungs were of no significance.

Since there are no characteristic anatomical and histological lesions in tetanus, a bacterio-



Lamb suffering from tetanus. Note the bench-like posture. When down this lamb was unable to rise unaided

logical examination and guinea pig inoculations were made to confirm the diagnosis. Tubes of a meat mash medium were inoculated from the stump of the tail, and incubated for 96 hours. Transfers were made to blood agar slants and incubated under anaerobic conditions. Miscroscopic examination showed typical *Cl. tetani.* In addition, 0.5cc of the meat mash medium was injected intramuscularly in the thigh of two guinea pigs. In 72 hours tonic contractions occurred in the muscles nearest the seat of injection; involvment of the other leg and back followed progressively. Reflex excitability could be noticed just before the death 72 hours later. This definitely confirmed the diagnosis of tetanus.

Usually the value of lambs does not warrant administration of tetanus antitoxin after docking, castration, or ear tagging. It is of importance that the operator be aseptic in his work. As already mentioned, 1% silver nitrate is recommended as a non-toxic antiseptic for wounds and disinfectant for instruments. To remove the black stains from the hands, wash with iodide, paint with tincture of iodine, and bleach with ammonia. Docking and castrating of ram lambs should be done at the same time. With a sharp scissors or knife one-third of the scrotum is cut off and the testicle pulled out with the cord. When lambs are over seven to ten days of age the cords must be cut and the danger of hemorrhage is greater. The

emasculatome is usually used for this operation, care being taken to insure complete separation of the cord. In the tail dock the emasculatome is first applied to crush the blood vessels, the skin is pulled toward the body, and the tail severed at the second joint with the emasculator. Lambs usually lie down in the afternoon, and contamination of open wounds with filth and clotted blood affords an excellent opportunity for tetanus bacilli. For these reasons, it is advisable to do these operations in the morning on clean pasture, thus allowing the lambs to exercise during the day to provide good drainage.

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"Swayback," a Demyelinating Disease of Lambs

"Swayback" is a nervous disorder of newborn or young lambs occurring widely throughout England, Wales and Scotland, also in Australia and New Zealand.[45] The incidence in Britain varies; sometimes as high as 90% of the lambs born on any one farm are affected. In some cases it is enzootic.

Symptoms include spastic paralysis of the limbs with varying degrees of incoordination and occasional blindness. The disease is progressive, the lambs dying from malnutrition and /or a secondary infection.

The chief pathology is a diffuse symmetrical demyelination of the cerebrum, varying in extent in different cases from small foci to gross involvement of the whole hemisphere. Liquefaction and cavitation is a common end stage; secondary degeneration of the motor tracts is always present. Bacteria or viruses are not concerned in the etiology. The "causal agent" causes no obvious disturbance in the health of the ewe, but exerts a pathological effect on the lamb *in utero*. It has a special affinity for the cerebral myelin and/or for the mechanism or cells responsible for normal development of myelin, the latter being destroyed with remarkable rapidity.

There are some indications that the disease may be somehow related to a copper deficency, copper having been found to have a prophylactic value in many cases. But the role of copper in the etiology is not understood, as analysis has shown no copper deficiency in the pastures concerned.

[45] Innes, J. R. M., 1939. Swayback: a demyelinating disease of lambs with affinities to Schilder's encephalitis. *Neur. & Psych.* 11, p. 323. Abst. in *Jnl. Nerv. & Mental Dis.* 91, p. 774.

Congenital Aplasia of the Udder

An example of congenital aplasia of the udder occurred recently in a Kansas dairy herd, in which there were 10 purebred heifers sired by the same bull.

The first of these heifers calved in October, 1938, with the right front quarter of the udder entirely non-functional. Inspection and palpation revealed very little glandular tissue present. She was a fair producer and was allowed to remain in the herd, little significance being attached to the "blind" quarter. The freshening of a second heifer, sired by the same bull, with the same condition, appeared to be a rather unique coincidence. Still more indicative was a third daughter of the bull freshening with the whole right side of her udder giving no milk and containing little or no glandular tissue.

Kitt[1] mentions a few cases of partially reduced quarters, which he calls congenital hypoplasia, and one case with the quarter entirely blind, congenital aplasia. Turner[2] also mentions a few cases. Other than these there are few recorded instances of this anomaly.

Although the seven other heifers by this bull have freshened with normal udders, it seems fairly conclusive that the occurrence of three such anomalies in the offspring of one bull indicates a hereditary condition. Whether these cows transmit the defect to their daughters remains to be seen.

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[1] Joest's *Special Pathology and Anatomy of Domestic Animals.*

[2] *The Comparative Anatomy of the Mammary Glands.*

Follicular Mange in Dogs

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FOLLICULAR mange is a serious problem of the canine world. It masquerades under such names as eczema, chronic eczema, skin trouble, summer rash, kennel rash, and many others, and is also referred to as red mange, demodetic mange, and incurable mange. It causes more discomfort and distress to dogs than any other malady. Dogs afflicted with so-called distemper either recover or die and the condition is over. Follicular mange, however, persists by recurrent attacks in spring, summer and fall, unless effective measures are taken to alleviate or cure it. The following observations and suggestions are the result of the author's attempts over a period of many years to find a satisfactory treatment.

Cause.—A mite microscopic in size, *Demodex folliculorum,* is the etiological agent of follicular mange. This mite lodges in the hair follicles and sets up an acute irritation through the toxins, secretions and excretions caused by its depredations. The hatching of the eggs and development of the young mites also give rise to a distention of the hair follicle with a resultant irritation.

Two contributing factors should be considered. First, atmospheric influences such as variation of barometric pressure. It has been noted on many occasions that symptoms are more acute in some years than in others. Second, age. In many acute cases it has been observed that lack of resistance due to old age or immaturity is very often manifested by great depletion of the animal with corresponding failure to respond to treatment. Spayed bitches and castrated males in many instances also show low resistance.

General supportive treatment should be administered to augment local measures in those cases which are accompanied by great depletion and unsatisfactory progress.

Origin.—It is safe to assume that the great majority of cases of follicular mange are traceable to the dam. It is also safe to assert that if a bitch is afflicted with follicular mange, her puppies will develop the disease, either at the age of four and one-half to six months or at the age of nine to 12 months. This is certain if the puppies have been nursed by the afflicted mother. It is the opinion of the writer that follicular mange is not transmitted by direct contact; it is believed that infection occurs entirely through the mouth. Carefully controlled experimental work has shown that it requires a minimum of two months for the symptoms to appear in a dog that has been fed with material in which live, active parasites have been found. On the other hand, no lesions or symptoms have been developed by the implantation of live parasites, pupae or eggs, and it is believed that it cannot be induced by direct contact. On many occasions sound dogs have been placed in the same kennel with dogs afflicted with follicular mange and kept thus in contact for a period of two months or more. In no case did these sound dogs contract the disease through this exposure, or exhibit any symptoms of it subsequently.

It is an all too frequent occurrence for a dog to develop symptoms of follicular mange within a week or month following admission to a veterinary hospital or kennel. In such cases the owner invariably believes that the disease has been "caught" in the hospital or kennel. Such an assumption is without foundation, as it has been established by the writer on many such occasions that such afflicted dogs either were the offspring of bitches having follicular mange, or had had previous attacks.

Symptoms

The outstanding symptoms in ordinary active cases are bare spots, ulcers, constant scratching and biting of the skin, and an unpleasant, fetid odor, which is particularly noticeable on rainy days or during and after a bath. This odor is often referred to as a "doggy odor." This term is erroneous and misleading, as there is no odor to a healthy dog. This characteristic "doggy" odor therefore can be considered as being a diagnostic

symptom of follicular mange, in either acute or chronic form and in apparently improved cases. In addition to being constantly present in otherwise apparently healthy dogs, this odor is definitely different from those associated with distemper, moist eczema, Stuttgart's disease, necrobacillosis, osteomyelitis, gangrene, bone necrosis, ulcers caused by streptococci or staphylococci, and other acute constitutional involvements. In badly aggravated cases emaciation is quite common and a marked lethargy or listlessness is also observed. The skin becomes thickened and wrinkled, the paws swollen and an oily discharge may also be observed in the sores and bare patches.

In chronic, subacute cases which exhibit no depilitated or inflamed areas, there are three diagnostic symptoms in addition to the characteristic odor: constant scratching, particularly noticeable at night after retiring, biting or licking the toes, forelegs and ankles, and constant shedding of hair. A close inspection of the axillae, abdomen and medial surface of the thighs may also disclose pimples, pustules or actively inflamed areas. It may be noted in most cases that dogs so affected have greater comfort out of doors than in heated quarters. When confined in heated quarters they usually lie at a door under which cold air is entering. By keeping cool they probably prevent the hatching of the eggs and lessen the activity of the mange parasites in the hair follicles, thus avoiding some of the irritation.

Treatment

Best results are obtained if the dog is clipped; otherwise it is impractical to treat the skin thoroughly. Owing to the fact that follicular mange parasites can be, and usually are, found in all parts of the body, it is advisable to treat the entire surface of the body, even to the areas between the toes. It seems probable that it is the heat caused by the contact of the toes, one with the other, that induces the hatching of the eggs of the parasite in this location, thereby causing an irritation which results in the dog licking or biting the tops of his toes. If not all eggs are hatched and the resultant parasite destroyed by the treatment, there may be a recurrence either at the next shedding period or when the dog is kept in a warm environment. A suspension of rotenone in oil has recently been produced for the treatment of this disease and some excellent reports have been made of success in the use of this preparation. Favorable reports have also been made of the efficacy of a product containing concentrates of rotenone and pyrethrum in isopropyl alcohol as a vehicle.

The demodetic mange mite is easily detected on microscopic examination. Here are five stages of *Demodex folliculorum*, from egg to mature "grub"

The ideal method of applying the treatment is to do so in the sun or in a room with temperature of at least 75°F. Heat is used in connection with the treatment to bring about the incubation of the eggs in the hair follicles so the resultant parasites can be destroyed. Heat is most essential for effective treatment. It is advisable to continue treatment for at least three weeks in order to hatch all eggs and kill the larvae. Severe cases may require a longer period. There is considerable evidence that hatching of the eggs is delayed for a long period, if not permanently prevented, if the skin is kept cool.

Permanent eradication of the symptoms has been noted in cases that have been treated thoroughly for a period of three weeks.

If it is not practical to clip them for thorough treatment, chronic, subacute cases can be given marked relief by saturating all areas that are being bitten or scratched. This alleviates the irritation and induces return of the hair growth on the affected parts. These areas are usually the paws, forelegs, rump, back, shoulder, face, axillae, and inside of thighs.

Veterinary Medicine in 1940

Lameness in the Horse[1]

Lameness is the greatest hindrance to the career of a racehorse. It is the greatest obstacle to training, and a constant threat during racing. It is the chief concern of horsemen and the major problem of the veterinarian who confines his practice to racetracks and racing stables.

Certain peculiarities of formation or structure, such as small bones, narrow joints, or defective feet, are major predisposing causes of lameness in the thoroughbred, upon which is superimposed early and too vigorous training and the stresses of extreme exertion, high speed and faults of tracks to make this incapacitating ailment a nightmare for the owner of such animals.

The common forms of lameness in racehorses, in both training and racing, include:

1. *Tendon Injuries.*—The treatment comprises rest for a year or longer; application of antiphlogistine during the acute stage (changed every 48 hours and the leg sprayed with cold water at each change), or daily use of diathermy and magnesium sulphate, ammonium chloride or zinc acetate lotions or a tight plaster of Paris bandage. Such treatments should be continued for about a month; then use line or puncture firing or blistering or both.

2. *Suspensory Ligament Injuries.*—The treatment is similar to that for bowed tendon and other injuries to these structures.

3. *Splints.*—The treatment is deep puncture firing, a light blister, and gentle exercise for a week.

4. *Ringbones and Sidebones.*—Strong blistering or deep puncture firing with several months of rest is indicated if undertaken in the early stages. Later, treatment is seldom of avail.

5. *Bone Spavin.*—This condition, rare in race horses, is best treated by puncture firing and blistering and a rest for several months.

6. *Joint Injuries.*—Antiphlogistine packs until the inflammation has subsided, followed by blistering or firing or both and several months of rest constitute relief and curative measures.

7. *Fractures.*—Fracture of the wing of the os pedis and of the sesamoid bones (proximal) is common. The former recovers after about three months rest. Hot applications and poultices are indicated

[1] Peters, J. E., 1940. Lameness incident to training and racing of the thoroughbred. *J.A.V.M.A.* 96:755, pp. 200-209.

On this and the following pages appear abstracts of the more important contributions to American veterinary literature during the last year. Since our readers have access to previous issues of VETERINARY MEDICINE, these abstracts do not include (a) abstracts of articles appearing originally in this journal (b) abstracts of articles from foreign periodicals, which are published monthly in this magazine (c) abstracts of papers presented at the 1939 meeting of the A. V. M. A., which were abstracted in the October, 1939, issue of VETERINARY MEDICINE. For convenience of reference, a representative list of articles and abstracts on each subject published in this magazine during 1940 is given at the end of each section.

This month the abstracts cover the literature in the fields of equine practice, cattle practice, sheep practice, and equine, bovine and ovine parasitology. The survey will be concluded in the next issue with similar abstracts dealing with swine, poultry, and pet animals, and their parasites; public health, nutrition, general therapy, etc.

until the pain is relieved. Fracture of the sesamoid may be simple, in which case they recover from the same treatment plus a cast when active inflammation has subsided, or comminuted, in which case the horse is destroyed for humane reasons. In fracture of other bones of the legs treatment depends upon the circumstances and the severity. The author has not seen a fracture of the humerus recover.

8. *Bucked Shins.*—Use hot and cold packs followed by a blistering agent.

9. *Osselets.*—Treatment consists in stopping training at the first sign of lameness, packing the fetlocks in antiphlogistine, which is changed every 48 hours, and after two to three weeks, deep puncture firing followed by a blister or absorbent paint and after the skin has healed a second blister.

10. *Navicular Disease.*—Treatment is usually unsatisfactory. Neurectomy is sometimes advisable.

11. *Quarter Cracks.*—Treatment depends upon the severity. If low, remove pressure from the quarter. If the crack extends to the coronary band, resection of the wall is best. Then use an iodine pack and later pine tar. Shoe with a wide web and bar shoe.

12. *Contracted Hoof.*—Shoe to secure constant frog pressure; keep the frog soft with hoof dressing; weaken the wall by grooving, and use mild irritants at the coronary band.

13. *Coronary Injuries.*—Give tetanus antitoxin. Trim the injured area with scissors, removing all lacerated tissue, and apply antiseptic dressings—metaphen, merthiolate and amphyl.

14. *Nail Punctures.*—Administer tetanus antitoxin; provide free drainage and pack with iodine. If the pain and lameness increase, the foot should be soaked in hot antiseptic solutions twice a day and poulticed between times.

[From the foregoing it will be seen that practices at the race tracks have not changed much in a century. Fire and blister, fire and blister, are the mainstays for most claudications, methods handed down by empirics of a former age. These barbarisms have been outmoded in other branches of veterinary practice for a decade by the hypodermic use of counter-irritants—a more certain, more controllable, and far less objectionable method.

Perhaps even more astonishing is the circumstance of a whole generation of research and development in nutrition having completely detoured the racing fraternity who feed their animals precisely as their grandfathers fed theirs. Army veterinarians have shown that most of the traumatisms named in the foregoing are suffered because the skeleton, ligaments and tendons are weakened by nutritional deficiencies, of which the common ration of racehorses is more productive than any other ever devised for animals outside of an experimental laboratory.]

General Anesthesia in Horses[2]

General anesthesia may be induced by (1) inhalation, (2) intravenous injection, (3) intraperitoneal injection, and (4) the ingestion of drugs.

There are many drugs that may be used in these various ways to induce insensitiveness to pain in equine operations, but practically chloroform by inhalation and chloral hydrate by intravenous injection are the only ones considered important at the present time. However, preliminary to any general anesthesia a basal narcotic should be given. It makes casting and restraint easier, lessens the amount of anesthetic required and therefore the hazard of anesthesia, lessens the fear and struggling at the beginning of chloroform anesthesia and probably the second stage of anesthesia.

Chloral hydrate is the most commonly used basal narcotic for large animals. For a thousand-pound horse dissolve one ounce in two quarts of water and administer via the stomach tube. Anesthesia occurs in a sequence of stages as follows: (1) analgesia, (2) delirium, (3) surgical anesthesia, and (4) cardiac and/or respiratory failure.

Obesity, septic infections, old age, marked

[2] Fowler, George R., 1940. General anesthesia in large animals. *J.A.V.M.A.* 96:755, pp. 210-219.

parasitism, fever, severe hemorrhage, cardiac involvement, and respiratory infections, particularly the latter, increase the hazards of anesthesia, as does also previous anesthesia within three months.

Chloroform Anesthesia

About 30 minutes after administering the basal anesthetic the patient should be cast and restrained recumbent, in as comfortable a position as possible, without offering any impediment to respiration. The mouth should be forcefully held closed by a strap under the mandible and over the nose, well above the openings of the nostrils.

Block the lower nostril with cotton and apply vaseline liberally both inside and outside the upper nostril. Wrap the nose tightly in a heavy turkish towel; have only one layer of the towel over the upper nostril. Immediately over this nostril, drop four or five minims of chloroform just as each inhalation begins. The administration of chloroform at this rate should be continued uninterrupted regardless of the struggling of the animal until the third stage of anesthesia is reached.

At the beginning of the inhalation of chloroform, there may be some struggling. At the beginning of the second stage, the pupil will dilate markedly, the pulse will be full and the rate increased and the animal may struggle violently. Toward the end of the second stage, respiration may cease suddenly for a short period; the pulse will continue. Care should be observed not to continue the dropping of chloroform during the cessation of breathing, but should be resumed again as soon as respiration starts.

At the close of the second stage, the pupil contracts to normal or even smaller, respiration becomes even and regular and the pulse slower. The eyelids close and the animal assumes the appearance of deep slumber. The sensation of pain, however, is still present and it is a mistake to begin the operation at this time.

The third or surgical stage of anesthesia is indicated by absence of palpebral reflex, slow rolling of the eyeball and a marked reduction but not absence of corneal reflex. This stage can be used for minor or quick operations where the pain is not great. For other operations, the administration of chloroform should continue uninterrupted, since it adds to the hazard to permit the animal to come partially out of the anesthesia or struggle at this time.

With continued administration of chloroform, the animal soon passes into a profound anesthesia, at which stage the regular dropping of the chloroform should be discontinued and only enough administered to maintain deep anesthesia, as indicated by the regular, shallow breathing and slow, uniform pulse.

As soon as the major part of the operation is over, the administration of chloroform should cease, but the towel should be left in place until the surgery is completed, when it should be removed and the cotton plug taken out of the lower nostril, all restraining devices released and the animal placed in as comfortable a position as possible. Unless the temperature be warm, the animal should be protected by a blanket.

Chloral Hydrate Anesthesia

The animal is first given the basal narcotic as for chloroform anesthesia, then cast and properly restrained, preferably on an operating table. A freshly made solution consisting of two ounces of chloral hydrate in a pint of sterile water is injected into the jugular vein. The injection is made through a 17-gauge tomcat catheter passed through a 14-gauge hypodermic which is inserted in the vein at the junction of the upper and middle thirds of the neck. The injection should be made slowly, at least 15 minutes being allowed for it.

Two ounces of chloral intravenously in addition to the basal narcotic is usually sufficient for a 1000-pound horse; however, an additional one-half to two-thirds ounce may be given after a few minutes if necessary, but this amount cannot be exceeded with safety and if the anesthesia is not deep enough it is better to employ local anesthesia as may be required.

The stages of anesthesia induced by chloral hydrate administered intravenously are essentially the same as for chloroform anesthesia, but not as marked, and the danger signals are much the same.

Equine Infectious Anemia[3]

Swamp fever, as this disease is commonly called in this country, has been known in Europe since 1843. Its infectious character was established in 1859 and that it is due to a filterable virus was proved by Carré and Vallée in 1905. Its distribution is practically worldwide. It is known to occur in 24 states in this country and is of considerable economic importance in several of them, particularly throughout the Mississippi Delta section. In addition to the Equidae, swine and possibly man also are susceptible.

Three types of this disease are common—acute, chronic and latent. These forms merge into one another and may alternate in the same animal. The chief symptoms of the various forms are:

Acute.—The onset is sudden; temperature 104° to 108°F.; respiration accelerated and usually of the abdominal type; marked weakness; trembling; low-hanging head; weight shifted from one hind leg to the other; congested conjunctivae; and insensitive lymphatic swellings on pendulous portions of the body often resembling anthrax.

Acute attacks last from three to ten days and usually terminate fatally, but may improve and become chronic or apparently recover only to relapse after weeks or months.

Chronic.—These cases vary in severity from animals that remain in fair condition and can do a considerable amount of work between recidivations which may occur only at intervals of several months, to animals that are rough of coat, unthrifty, and lose weight despite excessive consumption of feed and are quite incapable of working; even a single day in the harness throws them into an acute attack.

There are dropsical swellings on the legs, muddy discolorations of the visible mucous membranes, small hemorrhages on the nictitating membrane and nasal septum, knuckling and leg weakness. Many of these cases apparently recover from rest, particularly during the fall and winter, but break down again with the beginning of work in the summer.

Latent.—These are cases that make apparent recovery after one to several attacks of fever. They eliminate the infection in body discharges as long as they live and are capable of infecting other animals through association or the intermediary of bloodsucking insects. They could be regarded as true carriers of the disease except for the fact that continued hard work, heavy parasitic infestation, poor feed or other debilitating influence will usually break them down and bring on a chronic or even acute attack of the disease.

Treatment.—No known treatment is curative or of lasting value. Symptomatic treatment and supporting measures are the best that can be offered at present.

[3] Gates, William L., 1940. Equine infectious anemia. *J.A.V.M.A.* 96:755, pp. 195-199.

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Diagnostic Test for Equine Infectious Anemia[4]

The need for a satisfactory diagnostic test for equine infectious anemia led to experiments to determine whether specific immunologic reactions of diagnostic significance could be induced in infected or carrier horses. A preparation of serum from a horse ill with the disease caused a rise in temperature in several known cases of equine infectious anemia and in two of three suspected cases, but evoked no reaction in a horse known to be free from the disease. A similar preparation from the serum of a normal horse induced no reaction in either infected or healthy animals.

Because only one definitely noninfected horse was available as a control, these results are not conclusive, but merely indicative that this test may prove to be specific for the diagnosis of the disease. Whether specific or not, the possibility of the virus's still being viable and capable of inducing a carrier state in healthy animals tested must be investigated before the test can be used in the field.

[4] Torrance, Calvin C., 1940. A note on immulogic reactions associated with equine infectious anemia. *Am. Jnl. Vet. Res.* 1:1, pp. 63-65.

Vector of Equine Encephalomyelitis Discovered[5]

Kitselman and Grundman of the Kansas State College isolated the western type of equine encephalomyelitis virus from *Triatoma sanguisuga* collected in a pasture in which the disease occurred the year before and in which horses were pasturing at the time of collection. *T. sanguisuga* is a large bloodsucking bug known to feed upon horses. It is commonly called "assassin bug."

Several varieties of mosquitoes are known to be capable of transmitting encephalomyelitis virus from one animal to another, and various other biting insects are suspected of performing this role, but despite extremely diligent search no mosquitoes have ever been found infected in nature.

* * * *

Etiology of Periodic Ophthalmia[6]

It has been suggested that periodic ophthalmia is due to thyroid hypofunction. To test this theory, histopathological examinations were made of the thyroid glands of 21 horses with normal eyes and of seven horses with periodic ophthalmia. None of the horses with periodic ophthalmia showed evidence of hypofunction of the thyroid gland. The glands of the horses with normal eyes revealed all phases of secretory function. These limited observations are not in accord with the view that periodic ophthalmia is associated with thyroid hypofunction.

Testing the theory that Brucella infection is responsible for periodic ophthalmia in horses, agglutination tests were made with sera from 187 normal horses and 95 horses in various stages of periodic ophthalmia, and complete autopsies were performed on 32 cases of periodic ophthalmia. The experimental work is being continued, but the results to date indicate that Brucella organisms are not constantly present in periodic ophthalmia. Of the 32 cases on which autopsies were performed, complete bacteriological studies were made of 27; in none of these were Brucella organisms encountered. In 14 of these cases Listerella organisms were isolated from various organs; their significance in periodic ophthalmia, if any, has not been established.

* * * *

Periodic Ophthalmia[7]

Periodic opthalmia is an inflammatory disease of the eyes of horses and mules which possesses a tendency to frequent recurrence and usually terminates in blindness of one or both eyes. It is one of the oldest known diseases of animals. Vegetius described it more than 24 centuries ago. Despite its age the etiology of recurrent ophthalmia is unknown. At present it is thought that the cause lies in (1) environment, (2) feeding, (3) bacteria, (4) filterable viruses, (5) parasites, (6) allergy, (7) heredity, (8) dysendocrinia, (9) brucellosis, or (10) toxemia; or in a combination of two or more of these factors.

In making a diagnosis an accurate history is important and hard to get. Symptoms include photophobia, lacrymation, reddened conjunctivae and edema of the eyelids in initial attacks. In recurrent attacks in addition to the foregoing various changes occur in the structures of the eyeball. Five to eight attacks result in blindness; rarely, fewer may do so.

Treatment is extremely varied and generally unsatisfactory; however, certain measures are widely employed and generally indicated for relief of the pain, amelioration of the condition and prolonging the period of usefulness of the eye. They include placing the affected animal in a darkened stall to alleviate the photophobia; the instillation of atropine and pilocarpine alternately to dilate and contract the pupil to prevent synechia, and the use of hot applications to improve circulation and lessen the pain. In addition, foreign protein therapy has many advocates, as have iodine, salicylates, arsenicals, thyroxin, dionine, and silver and mercurial ointments.

[5] Kitselman, Charles H., and Albert W. Grundmann, 1940. Equine encephalomyelitis virus isolated from naturally infected *Triatoma sanguisuga* LeConte. *Kans. Ag. Exp. Sta. Bull.* No. 50.

[6] (1) Seibold, H. R., 1940. Report on the relationship of thyroid activity to periodic ophthalmia. *Am. Jnl. Vet. Res.* 1:1, pp. 52-53. (2) Jones, T. C., 1940. The relation of brucellosis to periodic ophthalmia in Equidae. *Am. Jnl. Vet. Res.* 1:1, pp. 54-57.

[7] Love, W. Graham, 1940. Some diseases of the eye of animals. III. Periodic ophthalmia. *J.A.V.M.A.* 97:763, pp. 312-319.

Hepatic Cirrhosis[8]

A disease occurring in the northwest states is commonly known as walking disease, protein poisoning, winter wheat poisoning, or stomach staggers. The disease occurs also in cattle and swine, and in these animals the rancher's name for it is Walla Walla hard liver disease.

The symptoms in the horse are given as follows:

Probably the earliest recognizable symptom is a slight yellowness of the mucosae of the eyes, nose and mouth and a refusal to eat grain. In working horses, the coat may appear unthrifty, does not shed readily and there is a history of sluggishness. In some cases these premonitory symptoms do not develop and the first symptom may be a furious delirium, followed by death in a few hours or days. Such cases would be clinically classed as acute, but autopsy reveals that they are of long standing insofar as lesions are concerned.

In the chronic cases the condition seems to come on more gradually. The visible mucous membranes may become a distinct yellow, although they may at times show congestion. In a case of long standing the membranes may clear up entirely for a time. Small, irregularly shaped ulcers usually develop on the mucous membrane of the lips and gums and the inside of the mouth may have an offensive, sour odor.

As the disease progresses, a gradual emaciation develops. The horse shows an unsteady gait and appears sluggish, sleepy, and stupid. If it is tied, it will swing in the halter or lean against the manger. If loose, it leans against any convenient object, such as a fence, building or post. If there is no object near, the animal shifts its position frequently from one foot to the other and occasionally takes a step or two in order not to lose its balance. The animal is observed to gape and yawn frequently; it continues to eat hay, but the appetite seems impaired as it does not show the same desire for food as a normal horse, and refuses to eat grain. . . . As the disease advances many affected horses become restless and desire to travel; they walk straight ahead, colliding with objects and walking through fences. When in the open country, they walk aimlessly for miles.

The most striking lesion consists mainly of changes in the liver. Extensive destruction of hepatic tissue, necrosis of functional cells and their replacement by connective tissue, occur. In acute cases the liver may be swollen but in chronic cases such as usually occur under field conditions the organ is shrunken and extremely hard.

The investigation carried out by McCulloch determined the cause of enzootic cirrhosis to be due to eating the seed of tarweed (*Amsinckia intermedia*). Other common names for this plant are: yellow burweed, yellow forget-me-not, fireweed, fingerweed, etc. The seeds are usually consumed by animals with wheat screenings or with the chaff about wheat straw stacks.

In both symptoms and lesions this disease closely resembles walking disease of horses in Nebraska and other plains states. The latter, however, is due to eating either of two species of Senecio common on the eastern slope of the Rockies.

[8] McCulloch, Ernest C., 1940. Hepatic cirrhosis of horses, swine and cattle due to the ingestion of seeds of the tarweed, *Amsinckia intermedia*. *J.A.V.M.A.* 96:754, pp. 5-17.

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Glucose Tolerance in Horses[9]

An experiment was conducted to determine the amount of glucose that can be administered to a horse intravenously without a spill over into the urine. In nine horses the renal threshold for this simple sugar was quite uniformly reached at a level in the blood of 150mg per 100cc. The normal sugar level for these horses appeared to be about 90mg per 100cc of blood. The lowest blood sugar level was 66.58mg per 100cc in a 17-year-old horse in poor condition. The renal threshold was approximately the same for this animal as for the others; hence it required the injection of a much larger amount of glucose to cause it to spill over in the urine than was required for animals having a higher initial blood sugar level. During the time the sugar was being eliminated in the urine the secretion of the latter was somewhat increased. About 75gm of anhydrous glucose will raise the sugar concentration in the normal 1000-pound horse to the point where sugar will be eliminated in the urine. About 15 minutes was allowed for the intravenous injection. The normal blood sugar level was soon reestablished.

[9] Link, R. P., 1940. Glucose tolerance in horses. *J.A.V.M.A.* 97:762, pp. 261-262.

Relation of Azoturia to Vitamin C Deficiency[10]

A theoretical consideration of the symptoms and lesions of azoturia suggests that this disease may be caused by a vitamin C deficiency. A deficiency of vitamin C in serum samples from horses affected with azoturia as compared with samples from normal horses has been demonstrated.

* * * *

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[10] Thomson, William M., 1940. An interpretation of the clinical and laboratory findings in azoturia. *Cor. Vet.* 30:3, pp. 341-349.

Cattle Practice[11]

Hemorrhagic Septicemia.—For prophylaxis, give each cow 100cc of hemorrhagic septicemia serum subcutaneously immediately before shipment. Within a week after arrival, if the animal is not carrying a temperature, give 5cc of pneumonia mixed infection bacterin. If cows are purchased from dealers, give 100cc of the serum as soon as they are unloaded and isolate for a week or ten days.

For treatment, give 150 to 200cc of serum, one-half intravenously and one-half subcutaneously, and 180 to 240gr of sulfanilamide, repeating the sulfanilamide in six and again in 12 hours. The second and third days, the same dose of sulfanilamide is given morning and night. If the owner objects to the use of serum because of the cost, the sulfanilamide alone, with such other symptomatic treatment as is indicated, gives good results.

Mortality rates are lower in stables which allow the entrance of enough fresh air (without a draft) to prevent the collection of moisture on the walls and windows. Sick animals should be blanketed.

In herds where new animals are purchased from time to time, it is a wise precaution to inject the entire herd each fall with hemorrhagic septicemia bacterin or aggressin.

Retained Placenta.—Unless the animal is off feed or showing signs of a septicemia from uterine absorption, wait 48 to 72 hours before removing a retained placenta. Manual removal is preferred. If the attachment is so firm that removal causes damage to the cotyledons, introduce three or four capsules between the placenta and the uterine wall and wait one or two days before trying again. (A good formula for uterine capsules is one pound each of boric acid and bismuth-formic-iodide powder and 10.5 oz. of bismuth subgallate; place in No. 10 capsules.) After the placenta and uterine debris are removed, a capsule is left in each horn. In these cases a general stimulant by mouth, such as 1gr of strych-

[11] Cushing, E. R., 1940. Cattle practice. *J.A.V.M.A.* 96:758, pp. 615-624.

nine sulphate three times a day, is useful. A daily dose of 3 or 4cc of pituitary extract for a few days is a profitable procedure. A return call is made in four to six days to remove debris by massaging the uterus per rectum. If absorption causes septicemia, inject intravenously 1.5gr acriflavin in 100cc of water; metaphen or phe-mer-nite may be used instead.

The chances for normal conception and calving following retained placenta are much improved if the cow receives a uterine douche of 0.5 to 1% hot Lugol's solution on the day of first estrum after calving. If cervicitis is present, swab the cervix with pure Lugol's solution. If chronic metritis is present, douche the uterus with hot normal saline solution until the return flow is clear and then introduce one to two ounces of pure Lugol's solution, massaging the uterus per rectum as the solution drains out.

Foot Rot.—As a prophylactic measure, place a shallow box filled with slaked lime in front of the stable door. It should be large enough so that the cattle have to walk through it, and the lime should be stirred with a fork twice a day so that it does not become packed down.

Treatment varies with the degree of localization. If there is a visible lesion, try to cut away all the diseased tissue. If the infection is diffuse above the hoof, soaking the foot in hot creolin solution is often helpful in localizing the infection so that it can be cut away. It is sometimes useful to paint the whole area with a 15 or 20% solution of silver nitrate and apply a wet pack of saturated iron sulphate solution or alcoholic solution of bichloride of mercury, 1:500, and bandage, changing the bandage after 48 hours.

Where foot necrosis is a common ailment, watch for cases of necro-bacillosis of the liver, which show symptoms similar to traumatic gastritis, with the addition of a rapid pulse and high temperature.

Parturient Paresis.—In addition to the routine treatment of injecting intravenously 250cc each of 23% calcium gluconate solution and 50% dextrose solution, inject 3 to 5cc of posterior pituitary extract subcutaneously or intramuscularly. If recovery does not occur within a reasonable time, examine the uterus for septic metritis, and if it is present give more pituitary extract and remove the debris from the uterus manually, by siphon, or by massage.

In every case of parturient paresis the digestive tract should be checked in four to eight hours and a saline purge given if necessary.

* * * *

Cattle Practice[12]

Shipping Fever.—For the best results, bacterins or aggressins should be administered at least 10 to 14 days before cattle are shipped. Aggressins afford greater protection. Immediate protection may be obtained by using 50cc of antihemorrhagic septicemia serum before shipment and 30 to 50cc upon arrival. Proper care and hygiene during transit and afterward reduce losses. Proper shelter, reduced rations, and plenty of fresh water on arrival are advised. If shipped cattle are placed immediately on full feed, their susceptibility is increased.

After hemorrhagic septicemia has appeared, temperatures should be taken three times daily and well animals segregated from the sick. Hydrochloric acid solution in 150 to 250cc amounts intravenously is recommended. Daily doses of 200 to 300gr of sulfanilamide have given good results. Calcium gluconate with dextrose is helpful for weak animals. In cases complicated with bronchopneumonia neoprontosil may be administered intravenously and intramuscularly in doses of 60 to 150cc daily. Mixed bacterin in 15 to 20cc doses sometimes produces satisfactory results; but there is some danger in administering bacterins or vaccines during or shortly after transportation.

Parturient Paresis.—Cows fed generously toward the end of pregnancy and heavy milkers are more susceptible. A valuable prophylactic measure is to avoid complete

[12] McConnell, W. C., 1940. Cattle practice. *J.A.V.M.A.* 96:759, pp. 695-703.

milking for 72 hours after calving. Milking small amounts at short intervals is recommended.

Atypical cases of parturient paresis which fail to respond to calcium therapy are usually complicated by a low magnesium level of the blood. Such cases present symptoms of nerve irritation, tetany of the fore and hind legs, hyperesthesia and, in extreme cases, convulsions. When these symptoms are encountered, the subcutaneous injection of a 20% solution of magnesium sulphate should be used as an adjunct to the calcium therapy. In cases which do not respond to calcium therapy and do not show the symptoms of hypomagnesemia, a urinalysis should be made for ketones.

Post-Parturient Ketosis.—Making ketosis determinations in dairy herds falling below expectations in milk production and/or producing off-flavored milk and/or losing flesh should be a routine procedure.

Dextrose therapy is good but relatively expensive. Chloral hydrate therapy is practical and near-specific. Give 90gm of chloral hydrate in the course of 36 hours, 24gm being the average dose. In severe cases additional doses may be required. Follow with the feeding of sorghum, syrup, sugar or crude dextrose, and correct feeding errors. In the licking-mania type of ketosis inject subcutaneously 200 to 250cc of 20 to 25% magnesium sulphate solution in addition to the chloral hydrate or glucose.

Impaction of the Rumen.—Administer 0.5 to 0.75gr of eserine or 0.06 to 0.12gr of arecoline subcutaneously; or 6 to 10gm of tartar emetic dissolved in liberal quantities of water, by mouth. Fasting one or two days and introducing 7 to 10 gallons of water into the rumen is effective, followed by kneading the walls of the abdomen over the rumen several times daily. Impending suffocation may be relieved by rumenotomy. Drastic purgatives are contraindicated. During convalescence the patient should be placed on a restricted diet for a few days and fed only succulent feeds.

Acute Flatulence.—The most reliable and simplest method of evacuating gases from the rumen is to massage both flanks gently with the knee or hands while the fore quarters are elevated. Placing a large bit or gag in the mouth or irritating the throat with a blunt instrument while the tongue is drawn forward facilitates the escape of gas. For medication, ammonia or a 2 or 3% saline solution via the stomach tube are valuable. Equal parts of aromatic spirits of ammonia and oil of turpentine in 120 to 240cc doses have given good results. In severe cases rumenotomy may be necessary.

Atony of the Fore Stomachs.—Withhold or restrict food for a few days; salt and plenty of water should be accessible. Turning the animal out to grass is advisable in light attacks. Medicinal treatment is indicated as in impaction. In cases of primary atony, especially following parturition, injections of calcium gluconate and dextrose are of benefit.

* * * *

Shipping Fever in Dairy Cattle[18]

The author's observations are based on field experience.

Etiology.—In cases resulting from exposure, change of feed and handling through transit, *P. boviseptica* is usually encountered. In "spontaneous" cases where no transit is involved, and which occur without any apparent reason, diphtheroid streptococci and *B. coli* are the pathogens most commonly found. All these are normal bacterial flora, apparently becoming pathogenic when the resistance of the animal is lowered.

Symptoms.—Rise of temperature to 103° to 107°F.; cessation of rumination and peristalsis and a diminished milk flow; lack of regurgitation; coughing; occasionally loss of appetite; shivering, listlessness; mucous membranes showing a generalized hyperemia; often nasal and lacrymal discharge of a serous nature later turning to

[18] Glenney, W. C., 1940. So-called shipping fever in dairy cattle. *J.A.V.M.A.* 96:757, pp. 461-465.

purulent. On the third to sixth day untreated cases may develop rapid breathing, grunting and groaning, and the front and rear legs may buckle.

Prognosis.—If called early, the practitioner can save 75% to 90% of the cases; if rapid, heavy breathing has developed and the animal refuses food, treatment is useless.

Diagnosis.—If 10% to 20% of a herd show a temperature of 103°F. or over, and there is a history of recent movement of animals, treatment should be instituted at once. Coughing is usually, though not always, present. "Spontaneous" cases usually show in addition a marked diarrhea at the beginning. If diagnosis is at all doubtful, liver, lung and spleen specimens packed in borax powder should be sent for laboratory examination.

Prophylaxis.—Vaccination at the time of shipment is of little value. If a week or two can be allowed for immunization, pulmonary mixed bacterins are the agent of choice. Although they will not give immediate protection, it is often wise to give the animals an initial dose of 5 to 10cc at the time of shipment in order to follow this with an increased dosage following exposure. Soda prior to shipment is of little or no value.

Treatment.—Since cost is a factor, pulmonary mixed bacterin is to be preferred; it is inexpensive and produces results as good as vaccines, aggressins and serums. Inject all animals twice weekly until new cases have ceased to occur, starting with 5cc, then 10cc, and thereafter up to 40cc, depending on the animal. Usually beneficial results will be forthcoming after two injections, if at all. Two or three injections three to four days apart will immunize the susceptible animals.

Sulfanilamide in doses up to three 30gm capsules daily is a valuable adjunct. In "spontaneous" cases the sulfanilamide alone gives good results. When the temperature falls below 102°F., but the appetite is poor, the treatment may be completed with a good tonic or pulmonary specific, in capsule or drench.

Diseases of Feeder Cattle[14]

The owners of feeder cattle should be encouraged to build small pens, crowding gates, and stocks to facilitate the handling of the herd.

Blackleg.—The carcass should be disposed of with great care, and all bovidae on the exposed premises treated with blackleg bacterin.

Infectious Keratitis.—Treat with keratitis bacterin; separate affected from non-affected animals and place two or three drops of 5% mercurochrome or 5% argyrol on the diseased eye once daily.

Actinomycosis.—If the tumor is circumscribed and free of vital structures, the area is shaved and 15 to 25cc of formalin injected. The line of separation which gradually occurs between the embalmed tumor and the surrounding healthy flesh should be treated with an antiseptic oil. In three or four weeks the tumor may be removed by torsion and the resulting open wound treated as such.

Anaplasmosis.—Segregate affected animals and use fly spray liberally on them to limit the spread of the disease. Sodium cacodylate (about 12gm for a 900-pound animal) is used, followed by a commercial powder containing arsenic and willow bark. The grain ration should be liberal.

Coccidiosis.—Segregate affected animals and dispose of feces where they cannot contaminate forage. Give three doses daily of equal parts of salicylic and tannic acid (15 to 120cc, depending on the size of the animal and the severity of the condition), suspended in a quart of water and given as a drench, until the condition abates. It is beneficial to follow this treatment with a one-dram to one-ounce dose of sun-cholera cure two to three times daily until the feces are about normal. Sun cholera cure is composed of equal parts of spirits of peppermint, spirits of camphor, tincture of rhubarb, tincture of capsicum, and tincture of opium.

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[14] O'Neal, W. S., 1940. Diseases of feeder cattle. *J.A.V.M.A.* 96:756, pp. 319-320.

Impaction of Rumen.—Administer via stomach tube one to three pounds of magnesium sulphate in three to five gallons of water and an antiferment. Rumenotomy is seldom necessary. In cases where it is indicated, introduce a large cannula into the rumen; insert through it a double-looped baling wire which is used as a pump to break up the impacted mass and remove much of it, water being pumped into the rumen meanwhile to assist the process. After the mass is broken up, the magnesium sulphate and antiferment are pumped into the rumen through the cannula.

Bloat.—Dry bloat may usually be relieved by the use of the stomach tube. The procedure for wet bloat is the same as for impaction of the rumen, except that it is seldom necessary to pump water into the rumen.

Traumatic Gastritis.—No treatment is attempted. Early diagnosis is important so that the animal may be sold while still marketable.

Enteritis.—The treatment is practically the same as that outlined for coccidiosis.

Foot Rot.—A concrete tank with four-inch walls is built around the water tank, and kept filled with a solution of 10 to 12 pounds of copper sulphate dissolved in 40 gallons of water.

Ocular Tumors.—It is usually more practical to market the animal than to operate on tumors of the eyeball. Extirpation of part or all of the membrana nictitans is practiced for neoplasms upon that structure.

Ringworm.—This usually clears up after a few applications of equal parts of tincture of iodine, glycerine, and chloral hydrate.

Sweet Clover Hemophilia.—Never attempt dehorning, castrating, or other routine operation on cattle recently fed on sweet clover or sweet clover hay; wait until they have been on other feed for two or three months.

Nutritional Deficiencies.—Vitamin and/or mineral deficiencies are concerned in most pathological conditions. In general, the diet should receive careful attention whatever the immediate problem.

The Control of Bang's Disease in Range Cattle[15]

Beef cattle handled under range and semi-range conditions require different methods for the control of Bang's disease than do dairy cattle. Experiments carried out on a range herd by the Montana Veterinary Research Laboratory led to the following conclusions:

1. The presence of a small percentage of reactor cows in a herd on range throughout the year does not constitute a serious menace.

2. Reactor cows in a herd fed hay during the winter may be the source of a serious outbreak of Bang's disease.

3. In a range herd where the breeding season is limited so that all calves are born within a 60-day period, the infection can be eliminated from the herd in two years by culling all 1:50 reactors to an annual test made about four months after calving is completed, even in the face of an active outbreak of the disease.

4. Replacement heifer calves should be vaccinated.

5. The breeding season should be limited to not more than 60 days; this is good practice from a production standpoint as well as for disease control.

* * * *

Drugs Useless in Treating Brucellosis[16]

Tests made at federal and state experiment stations have shown that drugs (including sulfanilamide) are of no value in the treatment of bovine brucellosis. Critical investigation of two widely-used "abortion cures"—3-V Tonic, made by the Crawford Company, Winona, Minn., and Bowman's, made by Bowman Laboratory, Owatonna, Minn.—proved that these remedies have absolutely no curative value.

Sulfanilamide is a recognized treatment for brucellosis in man and in a limited number of trials has given promise as a treatment for this disease in sheep.

[15] Marsh, H., and H. Welch, 1940. The control of Bang's disease in an experimental herd of range cattle. *J.A.V.M.A.* 96:757, pp. 473-477.

[16] Crawford, A. B., and B. A. Beach, 1940. Chemotherapy in bovine brucellosis. *Jnl. Agr. Res.* 60, pp. 565-574.

Calfhood Vaccination for Brucellosis[17]

A calfhood vaccination experiment was tried in an infected New Jersey herd maintained under a rigid test-and-slaughter program. Of the 188 heifers added to the herd in 1938 and 1939, 142 were vaccinated heifers and 46 unvaccinated controls. Twelve (8.5%) of the vaccinated heifers reacted, as compared with 16 (34%) of the unvaccinated animals.

Less than 0.2% of the vaccinated animals were sold because they did not return to a negative status after vaccination.

Calfhood Vaccination for Brucellosis[18]

Over a six-year period, a calfhood vaccination experiment was carried out in some New Jersey herds maintained for the production of certified milk. During this period 708 calves were vaccinated between five and seven months of age with Strain 19, and careful records kept of their subsequent history. All the herds were at the same time operating on a test-and-slaughter basis; all were continuing to show infection at each retest. When the vaccinated animals were added to the infected herds as heifers, they showed a high degree of resistance to infection as compared with non-vaccinated animals, the blood titre remaining negative in most cases. Data on 391 gestation periods of vaccinated heifers showed that 365 of the heifers concerned were negative at the time of gestation and subsequently, only four of the number being positive in a 1/200 dilution. In this group there were 17 abortions, 16 of them from causes other than *Br. abortus*, and 25 retained placentae, 24 from causes other than *Br. abortus*. The author concludes that vaccination with Strain 19 at the age of five to seven months seems to take off the "edge in susceptibility" and act as good insurance against Bang's disease.

[17] Mills, A. M., 1940. Report on Bang's disease vaccinated heifers in an infected herd. *Cor. Vet.* 30:2, pp.195-196.

[18] Tompkins, L. J., 1940. The experience of nearly six years with calfhood vaccination. *Cor. Vet.* 30:2, pp. 178-192.

TB Reactions in Brucellosis Infection[19]

Holth in Norway observed that some cattle affected with Bang's disease but "free from tuberculosis" react to tuberculin injected either intradermally or subcutaneously. To find whether infection with *Brucella abortus* sensitizes any considerable number of cattle and is, therefore, partially responsible for the large number of no-visible-lesion tuberculin-reacting cattle in Wisconsin, the author tested the serums of tuberculin-reacting cattle for agglutinins for *Br. abortus*, and made tuberculin tests on cattle experimentally infected with *Br. abortus*.

The serums collected from tuberculin-reacting cattle were tested for agglutinins for *Br. abortus* and the results correlated with the autopsy findings. Of 447 animals showing lesions of tuberculosis on autopsy, 13% showed agglutinins for *Br. abortus;* of 129 animals showing skin lesions, 3.1% showed agglutinins; of 229 animals showing no visible lesions, 5.6% showed agglutinins. Since the percentage of animals with a positive agglutination test was higher in the lesion than in the no-lesion group, the probabilities were that few, if any, of the tuberculin reactions in the latter group were due to nonspecific sensitization by *Br. abortus*. This conclusion was corroborated by the fact that the percentages of animals with agglutinins in the skin-lesion and in the no-lesion group were comparable, because while tubercle bacilli cannot be isolated from the skin lesions or other tissues of these animals, some other acid-fast bacterium is probably the cause and certainly abortion bacilli have never been indicated.

Intradermal tuberculin tests were made on three herds (135 animals) experimentally infected with *Br. abortus*. All were positive for *Br. abortus* within a few months; all were negative to the tuberculin test.

The authors conclude that, in contrast to

[19] Hastings, E. G., Janet R. McCarter, B. A. Beach, W. Wisnicky and J. S. Healy, 1940. Tuberculin reactions in cattle affected with Bang's disease. *J.A.V.M.A.* 96:755, pp. 186-187.

the findings of Holth, no significant number, if any, of the no-visible-lesion cattle in Wisconsin react to tuberculin because of infection with *Br. abortus*.

* * * *

Behavior of Br. Abortus Vaccine in Various Excipients[20]

The encouraging results obtained in studies during the last 10 years on retarded antigen absorption as a means of inducing greater immunological response led to an exhaustive investigation of the effect of *Br. abortus* vaccines suspended in various excipients.

It was found that *Br. abortus* Strain 19 may remain viable at the site of injection for at least 85 days following subcutaneous injection of saline suspended vaccine. The highest persistence of viability (at least 150 days) was obtained by using 2% cholesterol in liquid petrolatum as an excipient. On the theory that increased immunological response may be induced by retarded antigen absorption, this excipient has shown sufficient promise to justify further study.

No significant differences were noted in the agglutinin response induced as the result of *Br. abortus* inoculations in which various excipients were employed; nor were there any variations in general reactions.

Confirmatory evidence of the stability of reduced virulence exhibited by Strain 19 was demonstrated in 10 cultures recovered at intervals of 59 to 97 days from injection sites in different animals; carefully-controlled guinea pig inoculations without exception failed to reveal any evidence of enhanced virulence.

No variations in general reactions could be associated with the use of various excipients studied. Furthermore, the transient character of these reactions was similar to that observed in saline suspended injections.

[20] Eichhorn, A., C. K. Mingle, and F. M. Murdock, 1940. The behavior of *Brucella abortus* vaccine in various excipients. *Am. Jnl. Vet. Res.* 1:1, pp. 3-17.

Mastitis Caused by an Unusual Type of Streptococcus[21]

Streptococci of Lancefield's Group G were isolated from cases of mastitis in a small dairy herd. This type of streptococcus has not been reported previously as occurring in the bovine udder. The history of the herd and of individuals showed that this type of infection is contagious, and is permanent when once established. There was no evidence that the raw milk containing these streptococci is capable of inducing disease in man.

* * * *

The Bacteriology of Acute Mastitis[22]

Bacteriological examination of 54 cases of mastitis diagnosed as acute disclosed the following causative organisms: coliform organisms, 22; staphylococci, 8; Beta streptococci, 10; *Corynebacterium pyogenes*, 4; *Str. dysgalactiae*, 5; *Str. uberis*, 4. One culture was negative. Except in one case where *Str. agalactiae* was found together with Beta streptococci, the etiological agent of chronic contagious mastitis was not found. The types of organisms present and the incidence and nature of the acute attacks suggest wound infections; it appears that in these cases acute mastitis is neither contagious nor a stage of the chronic form.

* * * *

Control of Bovine Mastitis[23]

Four experimental herds were used in a study to determine the efficacy of bacteriological examination and segregation of infected animals in controlling mastitis.

In the first herd, infected cows were immediately removed from the herd. This resulted in the elimination of *Str. agalactiae* from the herd; infections caused by *Str. uberis*, certain atypical streptococci, staphylococci, etc., continued to appear.

In the second herd, infected cows were

[21] Miller, W. T., and J. O. Heishman, 1940. Bovine mastitis caused by unusual types of streptococci. *Cor. Vet.* 30:3, pp. 310-318.

[22] Ferguson, Jean, 1940. The bacteriology of acute mastitis. *Cor. Vet.* 30:3, pp. 299-309.

[23] Little, Ralph B., 1940. (1) The control of the chronic form of streptococcic mastitis. *J.A.V.M.A.* 97:763, pp. 212-220; (2) Streptococci other than *Str. agalactiae* found in the cow's udder. *Cor. Vet.* 30:4, pp. 482-494.

removed to a separate barn and cared for by different attendants, although the cows were together on pasture. This procedure also resulted in the elimination of *Str. agalactiae;* but *Str. uberis, Str. dysgalactiae,* atypical streptococci, staphylococci and other organisms continued to cause infections.

The infected cattle in the third herd were kept in the same barn as the normal cattle, but milked last. New cases of infection with *Str. agalactiae,* as well as of the other organisms mentioned, continued to appear.

The fourth herd was composed of cattle taken from the dam at birth, kept segregated from other cattle, and raised as nearly as possible under natural conditions, with no effort to force a maximum milk yield. They were never fed grain or silage; subsisting on pasture during the warmer months and a good grade of alfalfa hay and occasionally mangels in the winter. This herd, originally composed of nine heifers and a bull, after nine years consists of about 35 animals, of which 20 are breeding cows (including five of the original group, which have given birth to 45 calves during the period). During this period *Str. agalactiae* and *Str. dysgalactiae* were never identified in any sample of milk examined; *Str. uberis* and *Staph. aureus* appeared rarely and briefly in the secretion.

It appears from these studies that the chronic, contagious form of mastitis caused by *Str. agalactiae* (which is the most widespread and the most significant economically) can be quickly eradicated in a herd by bacteriological examination and immediate disposal of or segregation of infected cows. Acute attacks of mastitis caused by other streptococci and staphylococci are not eliminated by this method. It is quite probable that the natural habitat of the streptococci of mastitis, other than *Str. agalactiae,* is the cow or the environmental conditions under which she is maintained. The remarkable freedom from infection of the fourth herd suggests that it is the heavy demands placed on the modern dairy cow which are conducive to physiological changes rendering the glands more susceptible to infection from organisms naturally present in the cow or her environment.

* * * *

Insect Transmission of Bovine Mastitis[24]

Careful experiments show that the common housefly (*Musca domestica*) and the fruit fly or eye gnat (*Hippelates spp.*) are vectors of the various organisms causing bovine mastitis, transmitting the organisms from infected to non-infected cattle through feeding at the teat orifices. (Although insects are definitely incriminated as vectors of bovine mastitis, it is not intended to convey the idea that mastitis may not be transmitted by other means.) The author suggests that because of the indiscriminate feeding habits of these insects, it seems reasonable to suspect that they may serve as vectors of other infections, such as listerellosis and brucellosis, via the conjunctivae, teat orifice, mouth, vagina and skin.

* * * *

Soap as a Disinfectant for Mastitis Streptococci[25]

Careful experiments showed that solutions of ordinary commercial soaps and soap powders, in the concentrations usually obtained in lathering the hands with soap in warm water, are effective disinfectants against mastitis streptococci, and may satisfactorily replace other disinfectants for the hands of the milkers and the teats of cows. The soap solutions were between two and three times as effective as phenol, and equally effective as 100 parts per million of the most actively germicidal of several hypochlorites tested. "Green soap" and a coconut oil base liquid soap were inferior to, and medicated soaps no more effective than, the ordinary soaps.

Household lye is the disinfectant of choice for dairy barns, where it is especially necessary to destroy mastitis streptococci on the floors.

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[24] Sanders, D. A., 1940. (1) *Musca domestica* a vector of bovine mastitis. *J.A.V.M.A.* 97:761, pp. 120-123; (2) Hippelates flies as vectors of bovine mastitis. *J.A.V.M.A.* 97:763, pp. 306-308.

[25] McCulloch, Ernest C., 1940. The efficiency of soaps and other disinfectants in destroying mastitis streptococci. *Am. Jnl. Vet. Res.* 1:1, pp. 18-22.

Inaccuracy of the Brom-Thymol-Blue Test[26]

The brom-thymol-blue test has been recommended widely as a field test for the diagnosis of chronic mastitis, and has been considered valuable in detecting sub-clinical cases of mastitis where laboratory facilities are not available. Because of the extensive use of the test on this basis, a study was made in which the results of the brom-thymol-blue test were correlated with the bacteriological findings, using milk from 1,060 quarters of animals on three different farms. In 8.11% of the cases the brom-thymol-blue test was positive when the bacteriological findings were negative; in 29.34% of the cases the brom-thymol-blue test was negative when the bacteriological findings were positive. In other words, the brom-thymol-blue test was inaccurate in over one-third of the cases.

Sulfanilamide in the Treatment of Mastitis[27]

Group B (Lancefield) streptococci of bovine origin were treated *in vitro* against various concentrations of sulfanilamide. In one experiment it was found that some strains of streptococci could survive concentrations of 800mg in 100cc for 14 hours and 200mg for 72 hours at 38.5°C. It was evident, however, that the type of medium used for the test influenced the results.

The effect of the incubation temperature was determined in a second experiment. As the temperature was increased, the bactericidal action of the sulfanilamide was enhanced.

Considerable variation was observed in the ability of the different strains of streptococci to survive in varying concentrations of sulfanilamide under the same cultural conditions.

When a concentration of over 20mg of sulfanilamide was maintained in the blood and milk of the cows from which the cultures were taken, for five days and more, only one cow was observed to have received any benefit from the treatment. This animal was found to have been entirely cured of the streptococcus infection. The cow harboring the more resistant strain continued to shed streptococci in the milk after the same treatment. It is evident, therefore, that there is no correlation between the action of sulfanilamide on group B streptococci from bovine sources *in vivo* and *in vitro*.

Infusion Treatment of Streptococcic Mastitis[28]

During the past decade European investigators have used entozon in the form of an udder infusion for the treatment of streptococcic mastitis, with phenomenal success. Entozon has the following formula:

2, 3-dimethoxy-6-nitro-9-(y-diethyl-amino-B-oxypropylamino) acridine dihydro-chloride	5.88%
2-ethoxy-6, 9-diamino-acridine lactate	29.44%
Amyl saccharine	58.80%
Sodium biborate	5.88%

In a concentration of 1:1,250 it is relatively non-irritating and is capable of destroying *Str. agalactiae* in vivo.

The infusion is made by gravity pressure. A preliminary rinse of 200cc of entozon solution is infused into the completely milked-out quarter. After massaging lightly, this is withdrawn and replaced by the principal amount, varying with the capacity of the quarter; no more than 800cc need be given. This is left in the lactating udder for from 45 minutes to three hours, and in dry udders overnight.

In Schalm's trial of this method, 11 lactating and 11 dry cows were treated. Fifty-five of a total of 61 quarters affected were cured; 19 of the 22 cows were cured. To produce this result, 20 quarters required one infusion each; 19 quarters, two; 10 quarters, three; and six quarters, four, given at seven to 14-day intervals. Six quarters of the 88 infused reacted unfavorably, two undergoing partial atrophy, one complete atrophy, and the teats of the other three becoming occluded.

[26] Palmer, C. C., J. C. Kakavas and J. R. Hay, 1940. Correlation of the brom-thymol-blue test with the bacteriological findings in the diagnosis of mastitis. *J.A.V.M.A.* 96:754, pp. 47-51.

[27] Heishman, J. O., and W. T. Miller, 1940. The action of sulfanilamide on mastitis streptococci *in vitro*. *J.A.V.M.A.* 96:755, pp. 176-179.

[28] Schalm, O. W., 1940. The treatment of streptococcic mastitis by infusion of the udder with entozon. *J.A.V.M.A.* 97:60, pp. 20-27.

Selenium Poisoning[29]

Selenium poisoning is the cause of an acute disease of live stock commonly called staggers or alkali disease. It occurs when animals ingest seleniferous plants, or when soil on which crops fed to animals are raised is impregnated with heavy concentrations of organic selenium—a result of plowing under the seleniferous plants. Milk vetch is the main plant which saps insoluble selenium from the soil and converts it into the organic form so that it is taken up by wheat and other plants. The disease has occurred in western Canada and in the north central, midwestern and western states in the United States.

In the acute form of the disease, the animal wanders from the herd, walks blindly, often in circles, grates the teeth, drools, suffers from colic, displays a depraved appetite, presses forward against obstacles, goes completely blind, and dies in a state of paralysis. Symptoms of the chronic form include emaciation, depraved appetite, lameness, loss and loosening of hoofs and hair, gangrene of the extremities, stilty gait, open sores, rough coat, general depression and anemia. Calves and lambs of affected mothers may show symptoms of the disease. Lambs may be deformed and unable to control their legs.

Post-mortem lesions include emaciation, erosion of diarthroidal articulations, calcified marrow, fibrosis and atrophy of the liver, hepatic abscesses, petechiation and ecchymosis of the endocardium and other organs, swollen lymph nodes, and cardiac atrophy.

The minimum lethal dose of selenium has been set at 1.5mg per pound of body weight for horses, 4.5 to 5mg for cattle, and 6 to 8mg for hogs. The danger point is reached in plants containing five parts per million.

Treatment consists in administering large drenches of hot water (120 to 130°F.), up to three or four gallons every three or four hours and large doses of strychnine. This treatment brings good results if given before the organs are too badly damaged. Chronic cases show some improvement from this treatment when given nontoxic forage.

[29] (1) Davidson, W. B., 1940. Selenium poisoning. *Can. Jnl. Comp. Med.* 4:1, pp. 19-25. (2) Miller, W. T., and K. T. Williams, 1940. The minimum lethal dose of selenium as sodium selenite for horses, cattle and swine. *Jnl. Agr. Res.* 60:2, pp. 163-173.

Hormones in the Treatment of Ketosis[30]

Thirteen cases of acetonemia were treated with anterior pituitary lobe hormone (usual dose, 10cc subcutaneously), two with gonadotropes in the form of gonadin, one with anterior pituitary-like preparation, and one with anterior pituitary lobe hormone in addition to the anterior pituitary-like preparation. Some of the cases received additional treatment, such as glucose, molasses, and chloral. Although the data are too few to make a definite statement of specificity, they justify the conclusion that the anterior pituitary lobe hormone has merit in the treatment of ketosis. A few of the most marked cases recovered with no other therapy.

Albuminuria in Dairy Cows at Parturition[31]

Ten cases encountered in a country practice in New York, occurring just after or near the time of parturition, presented some unusual symptoms. The symptoms varied somewhat in the different animals. Several had the appearance of milk fever. All went down, with temperatures ranging from 101°F. to 103°F. One of the most constant symptoms was difficulty with the hind legs, which in some cases were swollen, in several cases appeared painful, and in most cases were extended when the animal was recumbent. A common factor in all cases was albuminuria, ranging from a trace to 0.861gm per 1000cc of urine. Milk fever, ketosis, parturient hemoglobinemia, and pyelonephritis were eliminated as factors.

To compensate for the loss of albumin, increased protein intake was prescribed. Egg whites were given in most of the cases,

[30] Fincher, M. G., and C. E. Hayden, 1940. The anterior pituitary lobe hormone in the treatment of ketosis in the dairy cow. *Cor. Vet.* 30:2, pp. 197-215.

[31] Freer, G. H., and C. E. Hayden, 1940. Suggested therapy for albuminuria in dairy cows at parturition. *Cor. Vet.* 30:1, pp. 57-66

and the percentage of protein in the ration increased. This therapy led to the recovery of all the cases but one. However, in most of the cases other treatment also was used, so that the specificity of the protein therapy cannot be definitely asserted. It is suggested that others test for albuminuria in obscure cases occurring at or near parturition, in which milk fever and ketosis have been eliminated as possibilities; and that where albuminuria occurs, the efficacy of the protein therapy be further tested.

By analogy with human therapy, about four dozen egg whites a day were given; sometimes during the first day one dozen every three hours. They were given in molasses and oil or in skimmed milk.

Lead-Arsenate Poisoning of Cattle[32]

Although approximately 44,000,000 pounds of lead arsenate are used in agriculture each year, deaths from this source among domestic animals are comparatively rare. Ruminants appear to be rather tolerant to lead. However, occasionally the threshold of toxicity is exceeded and losses follow. Such losses usually occur when exceedingly hungry animals consume large quantities of heavily sprayed materials.

Eighty steers which had been shipped a long distance were turned into a sprayed orchard where the family cows had for some time been grazing on alfalfa between the rows of trees with no untoward effect. The new animals were very hungry on arrival, and in addition to eating the alfalfa, some fed upon the leaves of the lower branches of the trees, and even licked the trunks. Nineteen of the steers died and several failed to make normal gains; also, the mortality during the winter was higher than usual. Samples of the rumen contents of one of the dead animals showed the presence of 0.008% arsenic, indicating the presence of over 35gm of lead arsenate in the stomach contents. Autopsy showed areas of erosion in the lining of the rumen and an intense enteritis.

[32] McCulloch, Ernest C., and J. L. St. John, 1940. Lead-arsenate poisoning of sheep and cattle. *J.A.V.M.A.* 96-756, pp. 321-326.

Bloat in Dairy Cattle[33]

Analyses of 44 samples of gases found in the rumen of cows affected with bloat revealed several toxic gases, of which carbon monoxide and hydrogen sulphide are toxic in small quantities when diffused in the blood. It is considered possible that intraruminal pressure paralyzes the rumen, preventing peristalsis of the paunch and liberation of the gases, which when diffused in the systemic blood may cause death from asphyxia. Remedies such as turpentine, kerosene or formalin in milk or water may check or stop the fermentation and release the gases produced. In acute cases, the gas must be released by puncturing the rumen.

Parturient Hemoglobinemia and Aphosphorosis[34]

The conditions under which parturient hemoglobinemia occurs and the chemical examination of the blood plasma and of feeds consumed strongly suggest a deficiency of phosphorus in the ration as a factor contributing to its cause. The use of dibasic sodium phosphate intravenously, combined with the administration of sodium phosphate or bone meal in drenches, corrects the hypophosphatemia found in parturient hemoglobinemia. As yet the data are insufficient to show whether this procedure is more specific than other forms of treatment commonly used; but the indications are that it is more promising than the use of such agents as urinary antiseptics, adrenalin chloride, and sodium cacodylate.

Further tests need to be made before the most desirable intravenous dosage of sodium phosphate is determined. One experimental dose used was 30gm, repeated the next day or the day following. About 400gm of dibasic sodium phosphate or of bone meal should be administered daily in a drench for several days, or until the patient can consume enough feed concentrate to supply its mineral needs.

[33] Olson, T. M., 1940. Bloat in dairy cattle. *So. Dak. Sta. Cir.* 27, p.8.

[34] Madsen, D. E., and H. M. Nielsen, 1940. The relationship of parturient hemoglobinemia of dairy cows to aphosphorosis. *No. Am. Vet.* 21:2, pp. 81-89.

Functional Sterility in Cattle[35]

Repetition of the same type of sterility following consecutive parturitions in the same individual has been observed.

In extremely advanced cases of nymphomania, conception can be obtained following treatment, regardless of whether they are noncystic cases of oophoritis or the more common cystic types. The prognosis in advanced cases of nymphomania should, however, be guarded.

Endocrine products are at times valuable accessories to treatment. They should at no time be used indiscriminately. Each case should be regarded as a separate problem, and studied carefully before treatment is prescribed, with particular reference to nutritional factors, which may be present even in well-fed animals. Behind many so-called endocrine disturbances are primary nutritional deficiencies, and supplying or bolstering up the endocrine requirement will cause only temporary improvement.

Paravertebral Lumbar Anesthesia in Cattle[36]

For operations involving the region of the flank of the cow (such as laparotomy, rumenotomy, cesarean section) the commonly-used field block anesthesia is far from satisfactory; it is usually incomplete, necessitating additional means of restraint; causes retraction of muscles, and thus ragged incisions; and causes additional injury to the tissues.

Paravertebral lumbar block completely and uniformly anesthetizes the operative field and also the corresponding abdominal viscera, decreasing intra-abdominal pressure. It is simpler, takes less time and anesthetic solution, and no other form of restraint is necessary; also, the post-surgical convalescent period is shorter.

The necessary equipment is a 10cc sterile syringe, a four-inch, 20- and 22-gauge needle, and a one-inch 16-gauge needle. Use 2% procaine solution, or any other reliable anesthetic.

To locate the site of injection for the first two lumbar nerves, a line is drawn transversely to the posterior border of the summits of the first and second lumbar spinous processes. The sites for injection are two inches lateral to the median line on these intersections. The hair is clipped at these points and the area disinfected. A 16-gauge needle is inserted through the skin only, creating a passage for the smaller, longer needle, because the skin is so thick that the regular needle would bend. The long needle is then inserted directly downward and parallel to the median plane for about two inches. The syringe is then connected with the needle, which is slowly advanced, and a small amount of the anesthetic injected.

The average depth to which the needle is advanced before contacting the nerve is about 2½ inches. If the rib or a transverse process is engaged at the point of the needle, the needle should be withdrawn for a short distance and directed slightly backward. Contact with the transverse process gives one a reliable gauge as to the depth of the nerve. One-half of the anesthetic fluid is injected at this point, the rest being distributed by pushing the needle back and forth until the entire 10cc has been deposited. About 5cc of the anesthetic solution is injected on the third lumbar nerve. Test field in five to ten minutes.

Listerella Encephalitis in Cattle and Sheep[37]

An acute infectious encephalitis caused by a short, gram-positive bacterium of the genus Listerella has been encountered in cattle, sheep and goats during the last ten years. It usually affects not more than 10 or 15% of a herd or flock; sometimes only one animal.

The affected animal at first is depressed, stands by itself, and is indifferent to its surroundings. A cow may show difficulty in finding its stanchion or in getting through

[35] Carlson, E. R., 1940. Functional sterility in cattle. *Cor. Vet.* 30:4, pp. 427-436.

[36] Farquharson, J., 1940. Paravertebral anesthesia in the bovine species. *J.A.V.M.A.* 97:760, pp. 54-57.

[37] (1) Graham, Robert, H. R. Hester, and Norman D. Levine, 1940. Studies on Listerella II: Field outbreaks of listerellosis in sheep and cattle. *Cor. Vet.* 30:1, pp. 97-111. (2) Olafson, Peter, 1940. Listerella encephalitis (circling disease) of sheep, cattle and goats. *Cor. Vet.* 30:2, pp. 141-150. (3) Graham, G. L. Dunlap, and Levine, 1940. Studies on Listerella III: Experimental listerellosis in domestic animals. *Cor. Vet.* 30:3, pp. 268-290. (4) Graham, C. C. Morrill, and Levine, 1940. Studies on Listerella IV: Unsuccessful attempts at immunization with living and dead Listerella cultures. *Cor. Vet.* 30:3, pp. 291-298.

a door, and may exhibit a staggering gait. On the second or third day, a tendency to circle in one direction (either right or left) may appear; this circling is almost invariable in sheep, but not in cattle. Impaired vision, some degree of facial paralysis and torticolis are usually present. Pushing or leaning against solid objects is common. An occasional case shows excitement. In the later stages, the animal falls and is unable to rise, lying flat on its side. Many become comatose. The disease lasts from three to seven days, and usually terminates fatally.

On autopsy, there are usually no gross lesions. In most cases, the infection is localized in the medulla.

The disease appears to be seasonal in incidence, a majority of the cases occurring from February to May, although scattered cases have occurred as early as December and as late as June.

Listerella encephalitis is easily differentiated from most common diseases. It may be confused with the toxemia of pregnancy. Facial and ear paralysis occur in encephalitis but not in pregnancy disease. Grinding the teeth is more common in pregnancy disease. Pronounced torticolis is more common in encephalitis. Feed-lot toxemia, the nervous symptoms of which may be confused with encephalitis, can be differentiated by the history of heavy feeding and the short course of the illness (six to 12 hours).

The manner of infection and portal of entry have not been ascertained. Attempts to develop a method of immunization have been unsuccessful. Treatment is usually ineffective. Recovery has been brought about in two typical cases by the use of prontosil (sheep) and sulfanilamide (cow). The treatment must be started early and the dosage should be large. Good nursing is essential. In peracute or fulminating cases, this treatment probably would not be effective.

The incidence of this disease in the United States is not high at present. The incidence in an affected herd or flock is usually low, but the disease tends to reappear on the same farm in successive years.

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Black Disease Immunization[38]

The single vaccination with a 5cc dose of alum-precipitated toxoid immunizes sheep against infectious necrotic hepatitis for at least 17 months. Tests to determine the full duration of immunity are under way.

Neuritis in Lambs[39]

After Erysipelothrix infections and tetanus are eliminated as causal factors, the most common cause of "stiff lambs" is a neuritis affecting animals from six months to one year of age. This appears to be a feed allergy; it is most commonly observed when lambs are moved from one region to another, or when the feed is changed. Treatment consists of placing the lambs on a reduced ration as nearly as possible like that on which they were reared.

Sources of Coccidiosis in Feeder Lambs[40]

During the study of an outbreak of coccidiosis among 16,000 feeder lambs in Nebraska an effort was made to determine the source of the infective oocysts and to evaluate drinking water and various feed materials as media for the sporulation and preservation of the oocysts.

Observations indicated that the feedlots were probably effectively sterilized by summer heat and drought, so that it was the fresh fecal material from lambs just arrived at the feedlots which led to the clinical infection. After the elimination of the drinking water and other feeds as factors, it was concluded that chopped feed, fed in open troughs that were never cleaned, was the main medium responsible.

From the history of this outbreak, it is indicated that all chopped feeds fed in open troughs that are not cleaned periodically are increasingly dangerous as sources of coccidial infection in wet weather, since these bulky feeds retain moisture well and provide ideal conditions for the sporulation, and preservation of oocysts.

Control of Coccidiosis in Feeder Lambs[41]

Twenty range lambs from a single shipment were divided into two groups kept under identical feed-lot conditions, except that one group was given a solution of copper sulphate and ferric sulphate (60gm of each to three liters of tap water) in the drinking water, in quantity sufficient so that each lamb received on the average 6cc daily. After the 17th day, when the oocyst discharge normally rises, the level of coccidial oocyst discharge from the treated lambs remained consistently lower than that from the untreated lambs. It is suggested that this procedure be tried with larger numbers of lambs under actual feed-lot conditions; if a comparable reduction in oocyst discharge occurs, the use of a copper sulphate-ferric sulphate mixture, perhaps mixed as a powder in the feed, may prove a valuable adjunct in controlling coccidiosis in feeder lambs during the critical five-week period after arrival.

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[38] Tunnicliff, E. A., 1940. Black disease immunization. *J.A.V.M.A.* 96:754, pp. 105-106.

[39] Mills, R. H., 1940. Stiff lambs. *Calif. Dept. Agr. Bull.* 29, pp. 13-15.

[40] Christensen, John F., 1940. The source and availability of infective oocysts in an outbreak of coccidiosis in lambs in Nebraska feedlots. *Am. Jnl. Vet. Res.* 1:1, pp. 27-35.

[41] Christensen, John F., 1940. The effect of copper sulphate and ferric sulphate on coccidial oocyst output in feeder lambs. *J.A.V.M.A.* 96:757, pp. 478-480.

Phenothiazine as an Equine Anthelmintic[42]

In preliminary tests on the efficiency of phenothiazine as an equine anthelmintic, three horses and one mule were used. Phenothiazine administered to these animals in doses of 80 to 90gm resulted in the removal of 94.5% of 53 strongyles and 100% of more than 100,000 cylicostomes. The indications from this preliminary work is that phenothiazine is the most effective anthelmintic as yet tried for these parasites.

* * * *

Phenothiazine as an Equine Anthelmintic[43]

Powdered phenothiazine was fed mixed with the grain ration in doses of 45gm for weanlings and 70 or 80gm for older horses. to a group of purebred Arabian horses. Estimates of the efficiency of the drug were based on fecal examination before and after treatment and similar examination of 28 control horses. The drug was found to be 100% effective in removing strongyles from 37 horses, and from 78% to 95% effective in eight horses; some of this latter group did not consume all the medicated feed and therefore did not receive the full dose of the drug. The treatment was also 100% effective in removing *Trichostrongylus axei* from four colts. It appeared to be ineffective against *Ascaris equorum* and *Gastrophilus* spp.

No toxic effects were noted in any of the treated animals, which included pregnant mares and mares with foal at side. Further, none of the foals which consumed part of their dam's medicated grain (in one case approximately 35gm of phenothiazine was consumed) showed any ill effect.

The efficiency of phenothiazine against strongyles, and its non-toxicity for pregnant mares, mares with suckling colts, and foals, suggest its value as a means of controlling equine strongylosis on large breeding farms, where efficient anthelmintic treatment has been impossible previously.

[42] Harwood, P. D., R. T. Habermann, E. H. Roberts and W. H. Hunt, 1940. Preliminary observations on the effectiveness of crude, unconditioned phenothiazine for the removal of worms from horses. *Proc. Helminth. Soc. Wash.* 7:1, pp. 18-20.

[43] Howell, C. E., and J. W. Britton, 1940. A field trial with phenothiazine as an equine anthelmintic. *Cor. Vet.* 30:4, pp. 526-532.

N-Butyl-Chloride as an Equine Anthelmintic[44]

N-butyl-chloride was found to be 100% efficient in one horse against Trichomonas and *Oxyuris equi*, at a dose rate of 0.1cc per pound of body weight in 10 times its volume of linseed oil. It was ineffective against Gastrophilus larvae and against Strongiyus. When horses were fasted for 36 hours prior to receiving the anthelmintic, there was a moderately severe reaction to the drug, manifested in inappetence and uneasiness. An obnoxious odor was noticeable in the feces and urine. This odor was not noticed in a horse fasted less than 18 hours or in one not fasted. The mucous lining of the glandular region of the stomach sloughed and was passed with the feces of some of the fasted horses. This did not occur in the unfasted horse.

* * * *

The Effect of Anthelmintic Treatment of Mares on Strongylosis in Foals[45]

Treatment of nine mares with carbon tetrachloride at approximately five and three months prior to foaling was followed by a 39% reduction in the rate of pickup of strongyle infection by the foals, as compared with the rate of pickup the preceding year when the anthelmintic was not used. The condition of the foals of the treated mares was superior in every respect to that of the untreated. However, the value of the treatment is not definitely established by these results, because of the circumstance that pasture conditions, which were normal the "untreated" year, were excessively dry the "treated" year, and it was impossible to estimate the degree to which this factor influenced the rate of pickup of infection by the foals through providing unfavorable environmental conditions for the larvae. It seems likely that the degree of infection in the mares was not reduced to the threshold value necessary to insure protection of the foals under normal pasture

[44] Trum, Bernard F., 1940. N-butyl-chloride as an anthelmintic. *Vet. Bul.* 34:1, pp. 20-24.

[45] Salisbury, G. W., D. W. Baker and J. W. Britton, 1940. Control of equine strongylosis, Part III: The effect of anthelmintic treatment of mares on the development of strongylosis in foals. *Cor. Vet.* 30:3, pp. 367-375.

conditions, and the value of annual treatment of mares, especially where no other attempt at control of parasitism is practiced, is therefore open to question in spite of the apparently favorable results of this experiment.

Miscellaneous observations made during the study included the effect of breed on resistance to infection, Belgian foals both years showing a decidedly greater resistance than Percheron foals; and the low strongyle egg counts of foals at weaning time, suggesting that treatment at this time is valueless.

Paratyphoid Infection Following Anthelmintic Treatment[46]

Severe reactions sometimes terminating in death quite frequently occur in apparently healthy horses following treatment for parasitic infestation.

Two such cases, one in a group of 32 and the other in a group of eight, terminated fatally following administration of a mixture containing oil of chenopodium. Both animals developed diarrhea and a high temperature, and died, one on the seventh and the other on the eighth day following treatment. The other horses in both groups showed no ill effects.

Both animals were found on post-mortem examination to be affected with gastritis and enteritis involving the whole intestinal tract. In both cases, *Salmonella typhimurium* was isolated from the internal organs and the intestinal contents.

It is the opinion of the writers that the horses in question were carriers of *S. typhimurium*, and that administration of the anthelmintic caused sufficient derangement of the intestinal tract to allow the organism to initiate a systemic infection. Bacteriological examination of the feces of the treated horses which did not react unfavorably revealed no further carriers of paratyphoid bacilli. A normal carrier was, however, found on the farm on which one of the affected horses had been reared.

[46] Dimock, W. W., P. R. Edwards and D. W. Bruner, 1940. The occurrence of paratyphoid infection in horses following treatment for intestinal parasites. *Cor. Vet.* 30:3, pp. 319-320.

Some Effects of Diet upon Internal Parasites[47]

An investigation conducted to determine the accuracy of a rather widely-disseminated belief that prunes fed to horses have an anthelmintic effect resulted in the finding that horses placed on a prune diet actually become more susceptible to strongyle infection than do control animals.

An incidental observation made during the course of the experiment was that horses on a vitamin-A deficient diet seem to possess a greater susceptibility to *Parascaris equorum*.

Inefficacy of Copper Compounds against Strongyles[48]

Although cupric sulphate, cupric chloride, cupric fluoride and cupric bromide are toxic *in vitro* for *Strongylus vulgaris*, they are not effective against strongyles *in vivo*. The copper salts stay in solution in an acid medium such as the gastric juice, and are therefore effective against such parasites as *Haemonchus contortus* in the lumen of the abomasum; but they precipitate when in contact with a neutral or alkaline medium such as the intestinal juice, and lose their toxicity for strongyles.

A Case of Trichomoniasis Treated with Phenothiazine[49]

A cow with a severe chronic infection with *Trichomonas foetus*, continuing for at least 15 months, was treated for 10 days with phenothiazine in doses ranging from 60gm to 14gm, a total of 234gm being administered. The trichomonads disappeared from the discharge seven days after treatment was started, and have not reappeared. The utero-vaginal discharge gradually disappeared, and the cow is now apparently normal. The apparent success of the phenothiazine in this case suggests its trial in other cases.

[47] Howell, C. E., and M. A. Stewart, 1940. Preliminary studies on the effects of diet upon internal parasites in horses. *Am. Jnl. Vet. Res.* 1:1, pp. 58-62.

[48] Whitlock, J. H., 1940. Studies upon *Strongylus vulgaris*. V. *In vitro* toxicity of copper sulphate and the cupric hallides. *Jnl. Parasit.* 26:1, pp. 49-57.

[49] Poelma, L. J., and George E. Daniel, 1940. An unusual case of bovine trichomoniasis and a suggestion for chemotherapy of the disease. *J.A.V.M.A.* 97:763, pp. 323-324.

Phenothiazine as an Anthelmintic for Calves[50]

Phenothiazine was administered to a number of calves in weakened condition due to parasitism. In doses varying from 50 to 80gm (0.44 to 1.1gm per kg body weight), the drug removed 100% of mature *Haemonchus contortus* and *Trichostrongylus axei*, and 99.8% of *Oesophagostomum radiatum*.

Limited tests showed that the drug at a dose rate of 0.44 to 0.55gm per kg body weight in calves weighing over 200 pounds was less effective against hookworms than when given to lighter calves at a dose rate of 0.66 to 1.1gm per kg body weight.

It was approximately 84% effective against *Ostertagia ostertagi*, slightly effective against Cooperia spp., and ineffective against Trichuris spp., *Strongyloides papillosus* and Moniezia spp.

Phenothiazine was found to be comparatively nontoxic for calves.

* * * *

Controlling Lice and Ringworm in Calves[51]

Disinfecting and whitewashing the calf quarters helps to reduce louse and ringworm infestation of calves. If weather permits, louse-infested calves can be washed with a sheep dip solution in strengths recommended by the manufacturer—usually about 3% for calves. This should be done only in warm weather. In cold weather, the following louse powder can be used:

Sulphur (sublimed) .....3 parts
Sabadilla Seed (ground).....1 part
Pyrethrum (powder).....1 part
Naphthalene (resublimed) .....1 part

This powder should be kept in an air-tight container in a cool place. It is most effective when freshly mixed. It should be dusted into the hair lightly over the entire body, with heavier application along the back, over the hips and pin bones, along the neck and around the poll. Blanketing the animal with a light canvas or burlap blanket for an hour or two after applying the powder increases its effectiveness.

For ringworm, scrub the affected parts with soap and water or soften with oil and then apply tincture of iodine. One thorough treatment will usually clean up an affected area.

* * * *

Ovine Thelaziasis[53]

Nematodes of the genus Thelazia, which are parasitic in the eye and surrounding structures of mammals and birds, have been reported as infesting cattle, horses, camels, swine, dogs and wild mammals and birds in the Old World. Only one species, *T. californiensis*, is known to be indigenous to the United States. This has been reported in dogs, in a man, and in a cat. It has been assumed that it is a natural parasite of the dog, and possibly even confined to this host except for accidental infestations.

Stewart reports finding this parasite in the eyes of sheep and of deer in California. His conclusion from various attending circumstances is that this worm is normally a parasite of herbivorous animals, and only accidentally a parasite of dogs, as it is of man. He considers it likely that it will appear in cattle and possibly horses as well as in sheep.

The life history and method of transmission of the parasite are not known at present. It appears likely that some arthropod is an intermediate host.

T. californiensis is whitish in color, the males measuring 7.7mm-13mm by 0.35mm-0.5mm, and the females 12mm-18.8mm by 0.36mm-0.53mm. When they are numerous in the eye they are not difficult to find, but if only a few are present careful and sometimes prolonged search is necessary. They are plainly visible when they move across the cornea or pupil, but are extremely active and quickly gain refuge beneath the membrana nictitans, in the conjunctival sac or lacrymal duct. Beneath the membrana nictitans is the best place to look for them.

[50] Swanson, Leonard E., Dale A. Porter and James W. Connelly. Efficacy of nonconditioned phenothiazine in removing worms from the alimentary canal of cattle. *J.A.V.M.A.* 96:759, pp. 704-707.

[51] Werner, George M. ,1940. Raising dairy calves. *Ext. Circ.* 308, *U. of Wis. Coll. of Agr.*, pp. 9-10.

[53] Stewart, M. A., 1940. Ovine thelaziasis. *J.A.V.M.A.* 96:757, pp. 486-489.

Symptoms arise from the irritation of the sensitive membranes. The hosts show a general nervous reaction. Irritation of the conjunctiva results eventually in a more or less severe conjunctivitis with excessive lacrymation, vascular injection of the conjunctiva, edema of the lids and photophobia. The eyes may remain closed and tenderness may be very acute. Keratitis may develop.

The most common therapeutic practice is to desensitize the eye by the instillation of a few drops of cocaine or other suitable local anesthetic, and then to remove the worms with forceps or a small cotton swab. The use of cocaine not only allows thorough examination, but also causes many of the worms to crawl out of the inner canthus. The prolonged or repeated use of cocaine, however, is contraindicated in the eye. Rather than the 2% solution that is usually recommended, it is better to make several applications, if necessary, of a 1% solution. A 10% solution of novocaine, although slower in action, does not produce the drying and injury to the superficial corneal epithelium that frequently follows the use of cocaine.

When there is reason to believe that not all of the parasites have been removed, an antiseptic collyrium, such as 1% cresol, a 1:2000 mercuric chloride solution or a solution of boric acid, may be applied daily for several days, following which the worms may be removed by means of forceps or irrigation. (The mercuric chloride solution is contraindicated when cocaine is employed.) After treatment consists of washing the eye frequently with boric acid solution, a 1:4000 solution of potassium permanganate, or a 1:4000 solution of mercuric chloride, as in simple conjunctivitis, until the inflammation has subsided.

When the parasites have become lodged in the anterior chamber of the eye, paracentesis of the cornea should be performed. The consequent escape of the aqueous humor usually brings the parasites with it. If the worms have not escaped, they must be removed with fine forceps through the corneal wound.

Control of Gastrointestinal Parasites in Market Lambs[52]

In a comparative study of the efficiency of (1) an oral drench of three ounces of 1% copper sulphate-1% nicotine sulphate solution and (2) 10cc of a 50-50 mixture of tetrachlorethylene and mineral oil, preceded by swabbing the oral cavity with 5% copper sulphate solution, each anthelmintic was administered to 14 lambs and one wether in a group just turned into winter fitting quarters. Parasitological examinations were made after slaughter. There was no clinical evidence of parasitism in any of the animals. The animals in the group receiving the copper sulphate-nicotine sulphate treatment were in optimum market condition at an average period of 83.3 days after treatment; those treated with tetrachlorethylene at an average of 62.6 days. The numbers of parasites of various species recovered from the gastrointestinal tracts of the animals suggested that tetrachlorethylene is a more effective drug for the control of the worm parasites of the abomasum and small intestine, while the copper sulphate-nicotine sulphate solution provides better control for the parasites of the large intestine.

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[52] Baker, D. W., and J. P. Willman, 1940. Control of worm parasites in market lambs. *Cor. Vet.* 30:3, pp. 401-404.

Book Reviews

Veterinary Obstetrics. *By W. L. Williams,* Professor Emeritus, Cornell University. Third edition. Cloth bound. 466 pages; 105 black and white illustrations, 4 color plates. Published by the author, 209 White Park Road, Ithaca, N. Y., 1940. $6.50.

This is a companion volume to the author's work *The Diseases of the Genital Organs of Domestic Animals,* published last year and reviewed in this publication in the January, 1940, issue, page 64.

The works of Professor Williams are in many respects a delight to read. The books of no other American veterinary author evidence so much care in their preparation. Each sentence appears to have been weighed and changed and reformed to say exactly what the author means and nothing else. There are no unnecessary words, no repetition and no digression from the subject under consideration. What is known is carefully distinguished from what is thought or surmised or reported without adequate support. What might otherwise become heavy reading is enlivened by frequent reference to the author's experience in practice and clinical observation in a professional career of more than threescore years—an experience in veterinary obstetrics and the genital diseases of animals that for variety, extent, magnitude and assiduous study is unparalleled among American veterinarians of this or any preceding period.

The author's views are a bit fatalistic, probably because of his conviction that veterinary obstetrics is on the whole probably not justified on economic grounds. The mortality of both dam and offspring is inevitably high, and when the life of the one is conserved the breeding value is at best problematical, while the other, even if delivered alive, has rather a remote chance of becoming a profitable animal. According to Williams, profitable handling of dystocia lies in its prevention.

Starting from the premise that dystocia, about which veterinary obstetrics largely revolves, is the consequence of errors in animal husbandry, is predictable and preventable and not due to whim or chance, it follows that the successful obstetrist must have a good knowledge of the anatomy, physiology and pathology of the genital tract, and to a clear-cut exposition of these subjects the author devotes almost a third of his work.

This striking departure from time-honored tradition brings the teachings of this work into conflict with others at many points. For example the author regards twins in the uniparous species not as an exemplar of high fertility, but as "generally associated with clearly recognizable genital disease" and a portent of reproductive disaster. Fetal dystocia, be it due to malposition or aberrent development, generally if not always has its origin in disease, as do uterine inertia, hydrops amnii and other obstacles to normal birth. Even monsters, the author believes, are due commonly to disease in the embryonic period, "non-mortal disease of the embryo having caused important or even gross deviations in the formation of one or more organs." One other cause of monsters and the resultant dystocia is recognized—incestuous breeding. This, the author states, frequently results in "bulldog calves" and muscle contracture (anchylosed calves). Dystocia due to an inadequate birth canal is regarded as caused by disease or malnutrition or inadequate nutrition of the dam during her fetal life or in calfhood. Further, the author is unable to find unquestionable proof that extra-uterine pregnancy has ever occurred in any of the domestic animals. Super-fetation he regards as exceedingly rare if it occurs at all and most of the cases so diagnosed as being more logically explained on other grounds.

The six sections of *Veterinary Obstetrics* are entitled: Obstetrical Anatomy, Obstetrical Physiology, Physiological Birth, Dystocia, Wounds and Injuries of the Genital and Neighboring Organs and the Puerperal Diseases. Within these main titles are 35 chapters each having numerous subtitles which appear to cover the whole subject without notable omission. Both the context and the classification of titles show the author's broad and practical knowledge of

the veterinary obstetrics. If many of the statements contained seem somewhat revolutionary in the light of the old teachings, there are few indeed who are qualified to challenge them. A book based upon a lifetime of personal studies and observations carefully analyzed to avoid misinformation could be assailed only by those who have made equivalent efforts. As veterinary literature has not yet furnished a counterpart to the meticulous work of the author on reproductive diseases of domestic animals, the handicap of a reviewer is self-evident. There is no previous experience to invoke nor favorite author to quote in attempting to refute the author's theories, deductions and advice. In short, the author has won the confidence of the veterinary world through painstaking work in the field and laboratory and possesses the knack of telling the facts without deceptive exaggeration.

Dystocia, the various types of monsters, the many malpresentations, the uterine and pelvic disorders, etc., are taken up one by one and discussed as to cause, diagnosis and treatment, as are also the untoward sequels—post partum hemorrhage, prolapse of intestine, bladder and uterus, rupture of the perineum, contusion of pelvic nerves, puerperal infections, etc. A final chapter discusses eclampsia in the various species of domestic animals and milk fever.

No description of this work can be accounted adequate without mention of the fine illustrations, of which there are more than a hundred in the text and in addition four colored plates. The illustrations are largely from the author's own dissections and supplement the printed text in a remarkably valuable manner.

The author concludes: "The advancement of veterinary obstetrics is best assured when the reader examines critically each statement. It may be well to hold the author's views in respect, but the veterinary obstetrist should compare the observations of the author with his personal experience, and finally draw his own conclusions. The highest value of a treatise upon veterinary obstetrics is that it may encourage the reader to observe and think."

Veterinary Bacteriology. *By I. A. Merchant,* D.V.M., Ph.D., C.P.H., Associate Professor of Veterinary Bacteriology and Hygiene, Iowa State College. Cloth bound; 628 pages, 135 illustrations. Iowa State College Press, Ames, Iowa, 1940. $7.00.

Essentially this textbook, which is to serve as an introduction of bacteriology to students in veterinary medicine, emphasizes the general morphological and physiological characteristics of bacteria and is concerned primarily with the species of bacteria, yeasts, molds, and filterable viruses which are pathogenic to animals. An elementary introduction to the principles of infection and immunity is also included to establish a basis for the study of pathogenic forms.

The work is divided into four parts. Part I deals with the general biology of microorganisms, including chapters on the scope and history of bacteriology; morphology and colony characteristics of bacteria, yeasts, and molds; the physiology of microorganisms; bacteriological technics and methods; and sterilization and disinfection. The chapter on sterilization and disinfection includes a discussion of each of the commonly used antiseptics and disinfectants.

Part II deals with the subjects of infection, resistance and immunity, including chapters on the mechanism of infection, the principles of immunity, toxin and antitoxin, agglutination and precipitation, cytolysis and alexin fixation, phagocytosis, and anaphylaxis and allergy.

Part III, which comprises more than 300 pages, is devoted to the pathogenic bacteria and molds. The former are classified in 27 and the molds in 12 genera. The discussion of pathogenic molds, however, is brief.

Part IV deals with viruses and bacteriophages. As is inescapable in the discussion of a subject about which, as compared with bacteria, little is known, some statements seem open to question; *e.g.* "Definite saprophytic types of viruses have been found." Also calling what is commonly known as fox encephalitis "fox encephalomyelitis," making no mention of the relation of the virus of swine influenza to the virus of human influenza or of the possibility that the virus of canine distemper may be pathogenic for man. The discussion of viruses is quite brief

and, on canine distemper at least, does not embody new information published during the last year or two. Nor is the urine listed as a vehicle for the spread of distemper from dog to dog.

Perhaps it is a typographical error that places the date of the first appearance of hog cholera in this country as 1883. *Veterinary Military History* states that hog cholera was first recognized in this country in 1859 and that by 1868, 15 years before the date here set for its introduction, it was occasioning an annual loss of 10 to 15 million dollars.

Merchant's *Veterinary Bacteriology* is a very satisfactory text and can be recommended without reserve.

* * * *

Hoss Doctor. *By R. J. Dinsmore*, M.D.V. Cloth bound; 311 pages. Waverly House, Boston, 1940. $2.75.

The remarkable popularity of books of the "Country Doctor" type is probably responsible for the sudden appearance of three describing the life and work of the veterinarian. They had no predecessors during the long period that veterinary medicine has contributed importantly to the public weal but has remained unknown to its chief beneficiary. Of the three—*Fifty Years a Veterinary Surgeon, Dutch Vet*, and *Hoss Doctor*—the first and last are autobiographies. *Dutch Vet* is biography in a fictional setting. The first, an account of professional career of the late Prof. Sir Frederick T. G. Hobday, has attained almost no distribution in this country, even among veterinarians, where it is entitled to a place in every library. *Dutch Vet* has had and is having a remarkable sale. *Hoss Doctor*, a better story, though less expertly told, and more applicable to American conditions, should achieve a like popularity. The three books should go far in acquainting the public with the importance of the work of the veterinarian to animal and human welfare and the difficulties inherent in the practice of animal medicine. The editor of this magazine receives rather frequent requests from veterinarians for source material, ideas or suggestions for addresses before business organizations, women's clubs, etc. These works furnish a wealth of such material.

The author of *Hoss Doctor* was graduated from Harvard 40 years ago and has practiced veterinary medicine in the same location in the vicinity of Boston ever since. His experiences have been those usual to a general practice, except that being all in the same environs, they lack the variety of those who have practiced in widely separated locations. Much of the work reads like a series of case reports—absorbingly interesting. Some philosophy is intermingled with the descriptions of patients, clients, treatments and operations, such as: "We're as healthy as our animals are; and our pocketbooks are as fat as their sides—and no fatter. . . . A society is no healthier than the milk it drinks and the meat it eats. . . . People are funny, hating those who help them. Dogs, now, are eternally grateful for help. . . . A little medical learning is a dangerous thing for your animal. . . . What you don't know may kill your dog." He dips his pen in vitriol on only two occasions; when he discusses the brucellosis-eradication program—"The federal program for Bang's disease eradication is expensive, unscientific, a needless waste of the taxpayer's money, and not worth a tinker's dam"—and when he mentions the opposition of the antis to anti-rabies vaccination.

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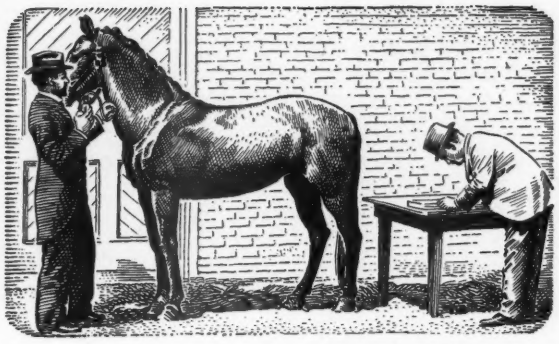

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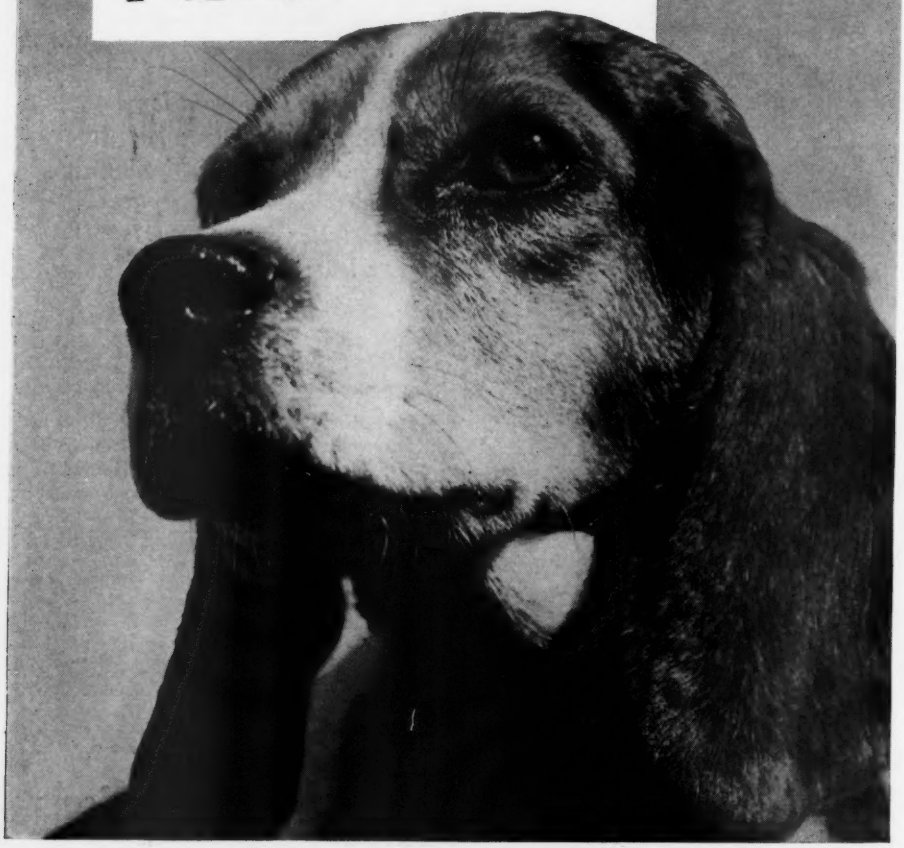

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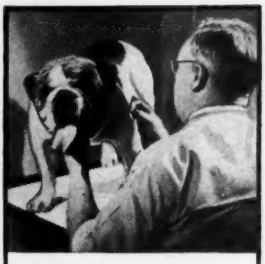

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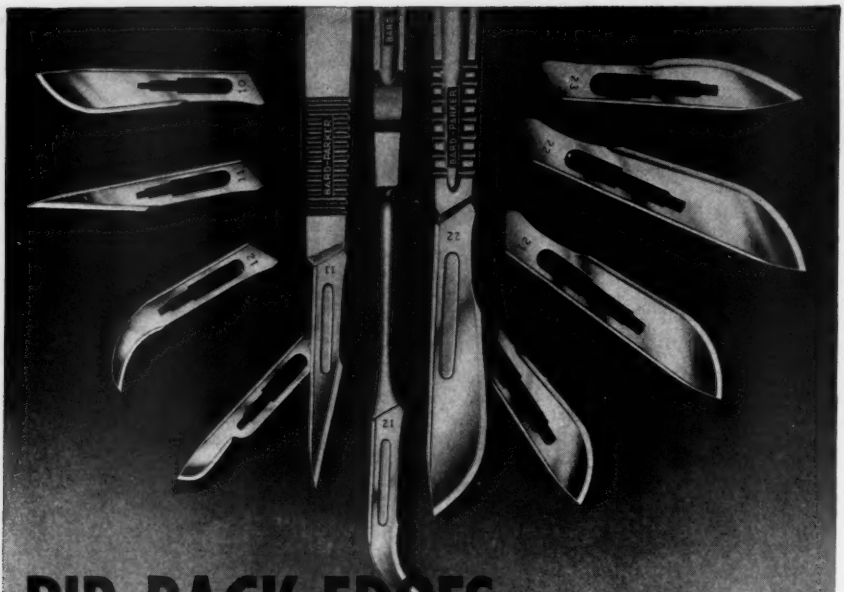

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NOVOXIL is supplied in ¼-ounce tubes and ¼-pound jars and ⅛-ounce ophthalmic tube. When administered internally, NOVOXIL can be incorporated in capsules from 00 size to ⅛ or ½-ounce, according to the size of the animal.

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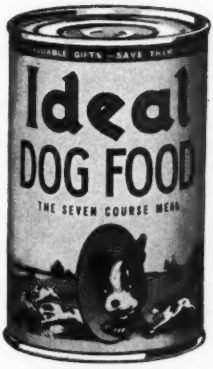

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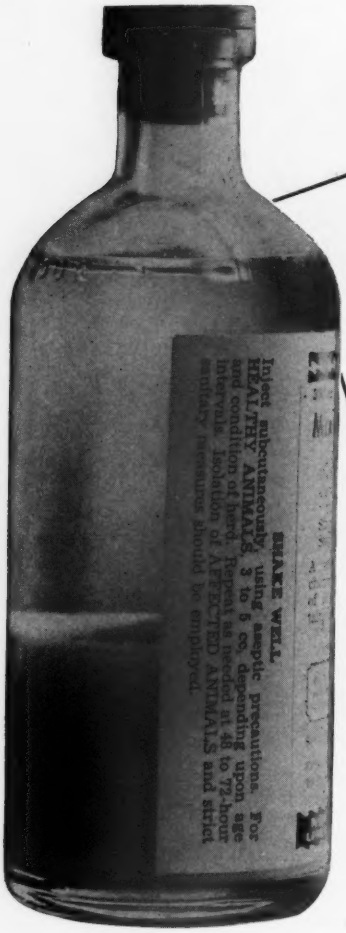
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Inject subcutaneously using aseptic precautions. For HEALTHY ANIMALS, 3 to 5 cc. depending upon age and condition of herd. Repeat as needed at 48 to 72-hour intervals. Isolation of AFFECTED ANIMALS and strict sanitary measures should be employed.

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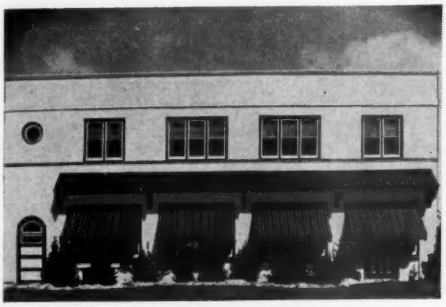

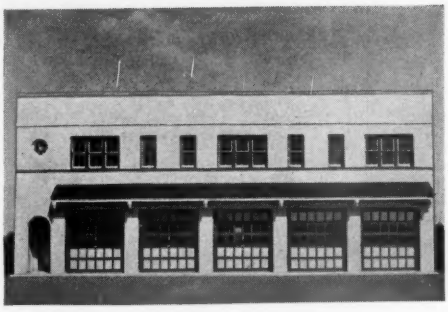

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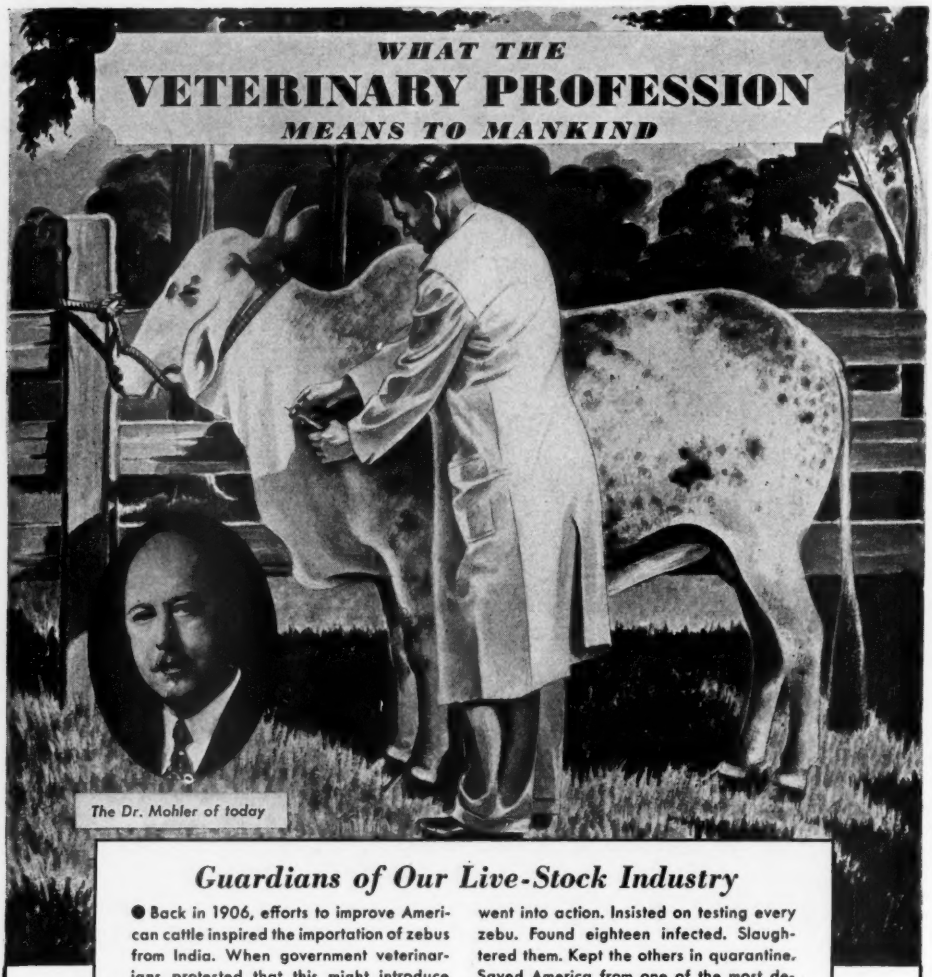

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Canine Distemper Vaccine and Virus

Lederle

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96% efficiency was observed in 1212 dogs immunized with "CANINE DISTEMPER VACCINE AND VIRUS *Lederle*" at the Cornell Morphological Station during a nine-year period.

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"As the result of our experiences with 285 dogs we are convinced that the Laidlaw-Dunkin Vaccine and Virus are of great value in protecting dogs against infection with distemper."

A highly impressive display of confidence in "CANINE DISTEMPER VACCINE AND VIRUS *Lederle*" was its use by the Admiral Byrd Antarctic Expedition. According to latest reports all dogs vaccinated with the Lederle Vaccine and Virus reached the ice in excellent condition.

When guiding the skeptical dog owner in the right direction concerning distemper immunization mention these convincing facts about "CANINE DISTEMPER VACCINE AND VIRUS *Lederle*."

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You'll Be Interested to Know That . . .

The first week in December will temporarily increase the veterinary population of Chicago to 600 or more, the attractions being the International Live Stock Exposition November 30-December 7 and the U. S. L. S. S. A. meeting December 4-6.

■

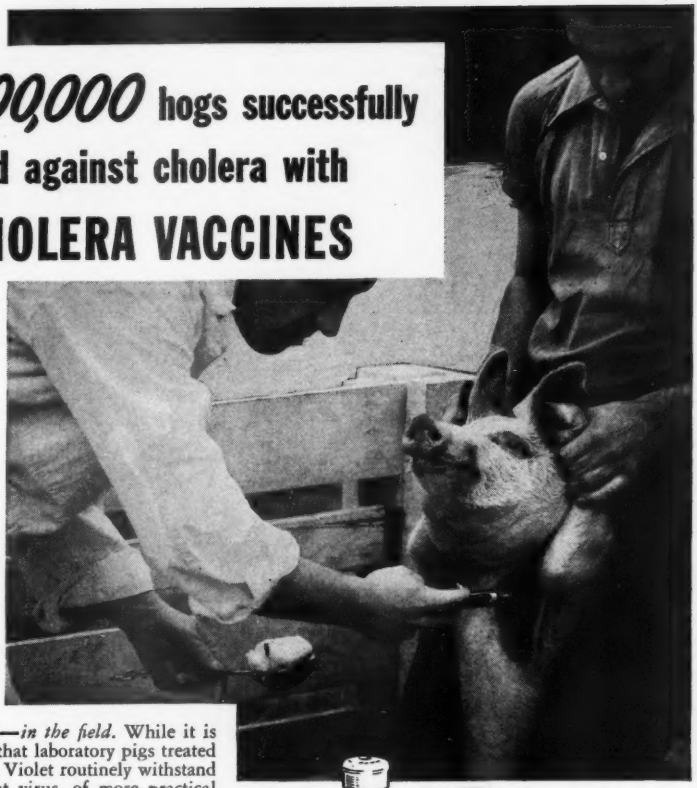
The bit of nonsense verse quoted some months ago on this page

> (We never saw a vitamin,
> We never hope to see one,
> And gosh, we can't say whether we
> Would rather C than B_1)

is already obsolete, for as a result of several years of research visualization of vitamin A is now possible. . . . Dr. Hans Popper, who came to Chicago in 1938 from the University of Vienna, is the man who achieved the hitherto impossible. The technic used is that of fluorescent microscopy, in which ultraviolet light is directed onto the substance being examined. Under a fluorescing microscope, the light is changed to diverse colors of visible light when striking the substance. Human tissue containing vitamin A appears in various green hues, while the vitamin A carriers appear like millions of silver sparks. The same phenomenon appears when a drop of cod-liver oil or other substance containing vitamin A is placed under the microscope. After one minute of exposure to the ultra-violet light, the vitamins are destroyed and the fluorescence disappears. . . . If you are skeptical, go to the Cook County Hospital, Chicago, and ask to see their pictures of vitamin A. In the photographs, the tissue and vitamins resemble starry heavens, sprinkled with stardust. They were displayed at the 23rd annual convention of the American College of Surgeons a few weeks ago, and attracted considerable attention from that august body.

Now that the election is over and you have accepted the results with profound thanksgiving or philosophical resignation, according to the color of your politics, the next thing on the program is Christmas, which manages to come around every year whoever is in the White House. . . . If you are looking for Christmas suggestions, here are a few. . . . A year's subscription to VETERINARY MEDICINE ($4.00; use the gift subscription blank enclosed in this issue), or a year's subscription to the new *American Journal of Veterinary Research,* an erudite quarterly which, as a vehicle for the more abstruse chronicles of scientific research provides for those who want to peruse the tabulated data rather than the results of the research in more easily-digested summaries ($4.00; address the American Veterinary Medical Association, 600 S. Michigan Ave., Chicago, Ill.) . . . In the realm of books, the two-volume *Veterinary Military History* is definitely "tops" as a distinctive and valuable permanent addition to the veterinarian's library ($10.00; turn the next page for details of special gift offer on page xxi). . . . Other worthwhile new books include Merchant's *Veterinary Bacteriology* ($7.00; address Iowa State College Press, Ames, Ia.), Williams' *Veterinary Obstetrics* ($6.50; address Dr. W. L. Williams, 209 White Park Road, Ithaca, N. Y.), and Udall's *Practice of Veterinary Medicine* ($6.00; address Veterinary Magazine Corp., 7632 S. Crandon Ave., Chicago, or the author). . . . For lighter reading, Roothaert's *Dutch Vet* ($2.50; address The MacMillan Company, 60 Fifth Ave., New York, N. Y.) or Dinsmore's *Hoss Doctor* ($2.75; address Waverly House, 156 Boylston Street, Boston, Mass.) are both interesting yarns. . . . To get away from literature: any practitioner would appreciate an up-to-date, smooth-handling small animal clipper, so if your Christmas enthusiasm runs into the $15-$20 bracket, either the Oster Small Animal Clipper ($19.50; address John Oster Manufacturing Company, Racine, Wis.) or the Stewart Clipmaster ($19.95; address Chicago Flexible Shaft Co., 5516 Roosevelt Road, Chicago, Ill.) is a safe bet. . . . If your goodwill is high, but your pocketbook low, an inexpensive gadget suitable for any dog owner is the Pard-Lite, a flashlight to be clipped to a dog's collar so that he can be seen at night (15c plus the labels from three cans of Pard dog food; address Swift & Company, Chicago, Ill. *Note*: this offer expires December 1st). . . . Another gift easy on the pocketbook but sure to be appreciated is one of the useful "practice booklets"—Canine Practice, Feline Practice, Sheep Practice, Swine Practice II, Equine Practice, Poultry Practice, Fur Animal Practice, Drugs Used in Veterinary Medicine, and Canine Pediatrics ($1.00, or any six for $5, or all nine for $7.50; address Veterinary Magazine Corp., 7632 S. Crandon Ave., Chicago, Ill.).

Over 100,000 hogs successfully immunized against cholera with HOG CHOLERA VACCINES



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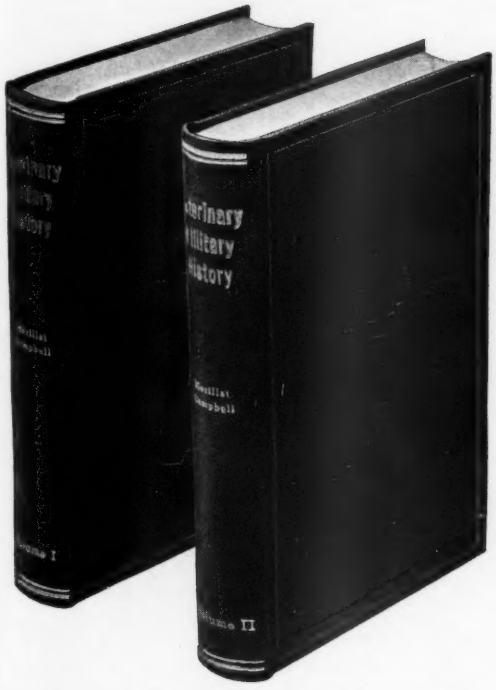

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E. A. Jenkins, in his article about brucellosis vaccination (pages 681-686), says that the test-and-slaughter method of control of Bang's disease is a case of *ad astra per aspera*. That seems to us a good description; the goal is a fine one, but the *aspera* in this case have proved to be pretty rough. . . . The stamping out of contagious pleuropneumonia in this country in the latter part of the last century, and the recent triumphant conclusion of the tuberculosis eradication campaign (page 671) show that the slaughter method of controlling contagious diseases works in cases where vaccination is ineffective and where the disease, once eradicated from a herd, does not have a tendency to flare up again inexplicably; but where practical immunity can be established so simply, and where, if it is not established, the disease recurs again and again after the slaughter of all reactors, it is difficult for Doctor Jenkins and hundreds of other practitioners like him to understand why the more expensive and less efficient method is adhered to so doggedly. . . . One frequently hears the statement "No disease was ever eradicated by vaccination." Two things are wrong with that saying: (1) it isn't true; smallpox has been so eradicated repeatedly from large areas, and (2) while intended to be derogatory to vaccination, it is just the opposite. It means that in most instances where vaccination has been used it has rendered eradication unnecessary.

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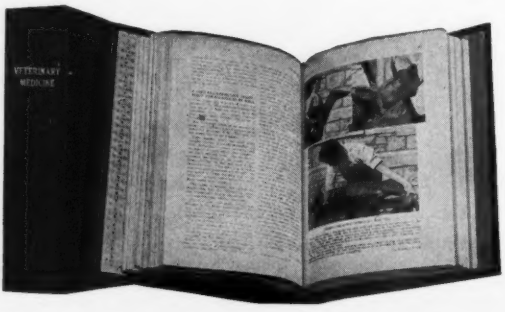

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Army Veterinary Corps

Transfers.—Lt. Col. Irby R. Pollard, from Fort Worth, Texas, to Headquarters, South Central Remount Area, San Angelo, Texas, Nov. 1; Lt. Col. Stanley C. Smock, from Madison Barracks, N. Y., to Fort Dis, N. J., Nov. 4; Ernest E. Hodgson, from Fort Logan, Colo., and additional duty at Southwestern Remount Area, Colorado Springs, Colo., to Southwestern Remount Area, Oct. 28; Capt. Walter T. Carll, from Fort Riley, Kans., to First Armored Division, Fort Knox, Ky., Nov. 15; Capt. Velmer W. McGinnis, from Fort Benning, Ga., to Second Armored Division, Fort Benning, Ga., Nov. 15; Capt. Clarence L. Taylor, from Fort Myer, Va., to Selfridge Field, Mich., Nov. 25.

Promotion.—To Captain: David S. Hasson, Oct. 24.

Veterinary Corps Reserve

New Acceptances.—1st Lts. Geo. Heath Brumble, Jr., Matthew J. Eggert, Woodrow Wilson Matthews, Joseph Sieger Ruhe, Richard Max Zirkle, Robert Otto Zimdahl.

Transfers.—1st Lt. Horace R. Collins, Jr., from Fort Worth, Tex., to Headquarters, South Central Remount Area, San Angelo, Tex., Nov. 1; 1st Lt. Harry A. Gorman, from Chicago Quartermaster Depot, Chicago, Ill., to Boston Quartermaster Depot, Boston, Mass., Oct. 6.

Ordered to Extended Active Duty.—1st Lts. Robert J. Au, to Seattle Quartermaster Depot, Seattle, Wash.; Geo. H. Brumble, Jr., to Carlisle Barracks, Pa.; Fred M. Harris, to Western Remount Area Headquarters, San Mateo, Calif.; Wilson M. Osteen, to Fort Reno, Okla.; Hendrik Versluis, to Army Medical Center, Washington, D. C.; Richard M. Zirkle, to Fort Reno, Okla.

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Deaths of Veterinarians

Hobart C. Ayer, Decatur, Ala., Ohio Veterinary College '92, May 5.

George Avery Root, 60, Yale, Mich., Ontario Veterinary College '06, practiced at Millville, N. Y., and Yale, May 14.

William F. Moore, 48, Cincinnati, O., Cincinnati Veterinary College '13, May 15.

John P. O'Leary, 75, Brooklyn, N. Y., Harvard University '95, July 16.

Gus Hewitt Dennis, 50, Havre de Grace, Md., University of Pennsylvania '12, practiced at Oxford, Pa., nine years and at Havre de Grace nineteen, September 3.

W. L. Evers, Iowa Falls, Ia., Western Veterinary College '00, September 11.

Charles A. Hatterscheid, 63, Glendive, Mont., Chicago Veterinary College '03, practiced in Glendive since 1917, district deputy state veterinarian, September 16.

John J. Staab, 48, Montpelier, Vt., McKillip Veterinary College '14, B. A. I. since 1915, inspector in charge of tuberculosis and Bang's disease eradication in Vermont since 1938, September 22.

W. J. Williams, Plymouth, Ill., K. C. V. C. '15, September 25.

Harry C. Kettner, 54, West New Brighton, S. I., New York, New York University '08, in 1916 lieutenant in the 23rd Division of the New York State National Guard, serving on the Mexican border until the United States entered the World War, when he went overseas as a lieutenant in the Veterinary Corps, U. S. Army. At the close of the war he was appointed assistant state veterinarian of Georgia, where he served until 1923. For the next 17 years he served as veterinarian in charge of horses of Headquarters Troop 51, Cavalry Brigade, New York State National Guard, at Staten Island. September 28.

Hugh Crawford Dillon, 39, Selma, Ala., Alabama Polytechnic Institute '25, in B. A. I. service, October 1.

John T. Wilson, Pawnee, Okla., Kansas State College '10, in an automobile accident in which his wife also was killed, October 4.

Vance Roy Lidstone, 58, Honesdale, Pa., University of Pennsylvania '07, practiced in Honesdale over 30 years, October 5.

Charles Porter Brown, 70, Bloomfield, Ky., city judge for 15 years, October 5.

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Sherman E. Bitler, Watsontown, Pa., Ontario Veterinary College '09, in the employ of the Pennsylvania Bureau of Animal Industry about 20 years, October 8.

David Cleveland Morgan, McComb, O., field veterinarian for the state of Ohio for the last 10 years, October 11.

W. T. Robins, 79, Edson, Alberta, Canada, Ontario Veterinary College, practiced at Spencer, Ia., and at Newtown, Indiana for 21 years before returning to Canada, October 13.

Wilbur J. Southey, 60, Fairfield, Conn., American Veterinary College '98, practiced in Bridgeport, Conn., for 42 years, his practice including the animals in Barnum and Bailey's and later in Ringling Bros.' circus for 29 years, October 13.

James B. Randerson, 72, Seymour, Wis., practiced in Seymour for 35 years, retiring in 1935, October 15.

Frank K. Voss, Antigo, Wis., October 17.

O. J. Phillips, 69, Schulenberg, Tex., K. C. V. C. '06, practiced in Missouri until 1929, when he came to Texas, October 17.

L. E. Lyons, 60, West Springfield, Mass., formerly of Miami, Fla., B. A. I., October 25.

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Kansas City Veterinary Medical Association, Kansas City, Mo., November 18.

San Diego County Veterinary Medical Association, Zoological Research Building, Balboa Park, San Diego, Calif., November 18.

Massachusetts Veterinary Association, Hotel Westminster, Boston, Mass., November 20.

Southern California Veterinary Medical Association, Chamber of Commerce Building, Los Angeles, Calif., November 20.

Arizona Veterinary Medical Association, Adams Hotel, Phoenix, Ariz., November 22-23.

Keystone Veterinary Medical Association, University of Pennsylvania, Philadelphia, Pa., November 27.

American Veterinary College Deans, Palmer House, Chicago, Ill., December 3.

United States Live Stock Sanitary Association, Morrison Hotel, Chicago, Ill., December 4-6.

Nebraska State Veterinary Medical Association, Grand Island, Nebr., December 10-11.

South Dakota Veterinary Medical Association, Carpenter Hotel, Sioux Falls, S. D., December 12-13.

California Veterinary Conference (sponsored jointly by the California State Veterinary Medical Association and the University of California), Davis, California, January 6-8.

Rhode Island Veterinary Medical Association, Crown Hotel, Providence, R. I., January 7.

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Kansas Veterinary Medical Association, Kansas State College, Manhattan, Kans., January 8-9.

Cornell University Annual Conference for Veterinarians, New York State Veterinary College, Ithaca, N. Y., January 8-10.

Ohio State Veterinary Medical Association, Deshler-Wallick Hotel, Columbus, Ohio, January 8-10.

Oklahoma Veterinary Medical Association, Skirvin Hotel, Oklahoma City, Okla., January 13-14.

Veterinary Medical Association of New Jersey, Hotel Hildebrecht, Trenton, N. J., January 15-16.

Tennessee Veterinary Medical Association, Noel Hotel, Nashville, Tenn., January 20-21.

Illinois State Veterinary Medical Association, Leland Hotel, Springfield, Ill., January 23-24.

Iowa Veterinary Medical Association, Hotel Fort Des Moines, Des Moines, Ia., January 28-30.

Ontario Veterinary Association, Royal York Hotel, Toronto, Ont., January 30-31.

Michigan State College Post-Graduate Conference for Veterinarians, Michigan State College, East Lansing, Mich., January 27-February 1.

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Illinois State Board of Veterinary Examiners, Chicago, Ill., December 9-10. Application blanks and instructions may be obtained from the Superintendent of Registration, Department of Registration and Education, Springfield, Ill.

Maine State Board of Veterinary Examiners, Augusta, Maine, January 13. Application blanks and instructions may be obtained from the secretary, Dr. S. W. Stiles, Falmouth Foreside, Maine.

■

The October issue of *Arizona Municipalities*, the official publication of the Arizona Municipal League, contains an interesting article on city meat inspection by Clinton H. Bugbee, head of the municipal meat inspection of Phoenix, Ariz., and the cover picture of the magazine portrays meat inspection in one of the Phoenix abattoirs. . . . Doctor Bugbee is one of the old-time B. A. I. veterinarians mentioned in the story about the Bureau of Animal Industry in the Nineteenth Century (pages 674-680). He resigned from Bureau service in 1900 to enter the army, returning to the Bureau after the Philippine War, and remaining until his retirement a few years ago, when he accepted his present position in Phoenix.

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